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Test and Evaluation

CAPABILITIES-BASED TEST AND EVALUATION

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This publication implements Air Force Policy Directive (AFPD) 99-1, *Test and Evaluation*. It describes the planning, conduct, and reporting of cost-effective test and evaluation programs as an efficient continuum of integrated testing throughout the system life cycle. This Air Force Instruction (AFI) must be used in conjunction with the AF/A5R *Requirements Development Guidebooks*; AFI 63-101_20-101, *Integrated Life Cycle Management*; AFI 17-101, *Risk Management Framework (RMF) for Air Force Information Technology (IT)*; and DoDI 8330.01, *Interoperability of Information Technology (IT), Including National Security Systems (NSS)*. This instruction applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, and Air National Guard. This instruction applies to all Air Force acquisition projects and programs regardless of acquisition category. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force

Records Disposition Schedule located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the Air Force (AF) Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. Any organization supplementing this instruction must send the proposed document to Directorate of Air Force Test and Evaluation, Policy, Programs, and Resources Division (AF/TEP), **usaf.pentagon.af-te.mbx.af-tep-workflow@mail.mil**, for review prior to publication. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("**T-0**, **T-1**, **T-2**, **T-3**") number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestor's commander for non-tiered compliance items. Waivers to mandates involving the acquisition program execution chain are processed in accordance with the acquisition chain of authority as specified in AFI 63-101_20-101.

(AFMC) This supplement implements and extends the guidance of Air Force Instruction (AFI) AFI 99-103, *Capabilities Based Test and Evaluation*, 18 November 2019. It applies to all AFMC units, This publication does not apply to the Air National Guard or the Air Force Reserve Command except for units under AFMC OPCON. This supplement may be supplemented at any level, but all supplements must be routed to AFMC/A3F for coordination prior to certification and approval. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through appropriate functional's chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). The authorities to waive requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See AFI 33-360, Publications and Forms Management, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority. AFMC/A3/6 is the waiver approval authority for all non-tiered compliance items per AFI 33-360. Route AFMC waiver requests from the Program Manager, to the Center Test Authority (see **paragraph 2.22**.), to the Program Executive Officer, to HQ AFMC/A3F, and then to the waiver authority.

SUMMARY OF CHANGES

This document has been extensively rewritten and should be read in its entirety. It incorporates multiple changes resulting from new statutory direction and Department of Defense (DoD) guidance including "Middle Tier" rapid acquisition and Developmental Test and Evaluation Sufficiency Assessments. This rewrite also captures changes in AF policy for Lead Developmental Test and Evaluation Organization selection and approval authority and test of Defense Business Systems, clarifies policy for experimentation in support of test programs, and incorporates guidance for agile software development testing. A greater emphasis has been placed on tailoring test programs to facilitate rapid acquisition, specifically document and coordination requirements.

(AFMC) This publication aligns MAJCOM Supplement with the recent AFI 99-103 revision. Updates MAJCOM supplement guidance regarding the Lead Developmental Test and Evaluation Organization (LDTO) assignment and responsibility.

Chapter 1

TEST AND EVALUATION CONCEPTS

1.1. Purpose of Test and Evaluation. The purpose of test and evaluation is to ensure DoD acquires systems that work and meet specified requirements. Additionally, overarching functions of test and evaluation are to mature system designs; manage risks; identify and help resolve deficiencies as early as possible; assist in reducing unintended cost increases during development, operations, and throughout the system life cycle; and ensure systems are operationally mission capable (i.e., effective, suitable, survivable, and safe). Test and evaluation provides knowledge of system design, capabilities, and limitations to the acquisition community to improve system performance before production and deployment, and to the user community for optimizing system operations and sustainment after production and deployment. The Test and Evaluation community will:

1.1.1. Collaborate with capability requirements sponsors and system developers to field effective and suitable systems that meet program baseline goals for cost, schedule, and performance.

1.1.2. Provide timely, sufficient, accurate, and affordable information to decision makers to support production and fielding decisions.

1.1.3. Provide data and information in support of managing risks during acquisition, fielding, and sustainment by accurately characterizing system technical and operational performance throughout the system life cycle.

1.1.4. Support the acquisition and sustainment communities in acquiring and maintaining operationally mission capable systems for Air Force users.

1.1.5. Provide information to users to assess mission impacts, develop policy, improve requirements, and refine tactics, techniques, and procedures.

1.2. The Acquisition Environment. The Integrated Life Cycle Management Framework is the overarching system of concepts, methods, and practices the Air Force uses to effectively manage systems from capability gap identification through final system disposal. The goals of Integrated Life Cycle Management are to recapitalize Air Force capabilities through maximum acquisition cycle time efficiency, provide agile support that will optimize fielded capabilities and the supply chain, minimize the logistics footprint, and reduce total ownership cost. Integrated Life Cycle Management begins with capabilities-based requirements development and continues with capability-based acquisition, Test and Evaluation, expeditious fielding, sustainment, and final disposition. See AFI 63-101_20-101 for details.

1.2.1. Software Intensive Acquisition. DoDI 5000.02, *Operation of the Defense Acquisition System*, describes various defense acquisition program models tailored to the type of product being acquired or need for accelerated acquisition. The objective is to balance needs and available capability with resources, and place capability into the hands of the user quickly. The success of the strategy depends on phased definition of capability needs and system requirements, maturation of technologies, and disciplined development and test leading to production of systems with increased capability. Models 2 and 3 (**Figures 4** and **Figure 5**) in DoDI 5000.02 address software-intensive programs; Model 3 highlighting rapid delivery of capability. Regardless of acquisition strategy, an appropriate level of independent test is

required prior to fielding new capabilities. Integrated test strategies should be utilized to maximize developmental test and operational test involvement as well as streamline test processes. A developmental test sufficiency assessment, as well as a certification of readiness for operational test, will be generated. Further, each limited deployment software release that impacts the system's net-ready-key performance parameters will drive the requirement for net-ready-key performance parameter certification or assessment.

1.2.1.1. System acquisition is increasingly software-intensive. Programs may develop and deploy a series of releases within a formal acquisition increment, formulate more fluid agile techniques, or use a combination that best fits program requirements. A distinct, tested, deployable software element of a militarily-useful capability to the government will be referred to as a "release." A release may be a subset of a formal acquisition increment or the final product. Releases incorporate multiple "builds," or iterative batches of software that meet a specified subset of the requirements that may be deployable in some cases. For consistency, "release" will be the only accepted term used to describe the smallest fieldable/deployable software element in all future AF Test and Evaluation Master Plans, test plans, and test reports as well as updates to previous documents. Reference the glossary in **Attachment 1** to distinguish the terms: "release," "build," "block," and "increment."

1.2.1.2. Each software release must undergo test prior to deployment, regardless of whether the program falls under DoDI 5000.02, DoDI 5000.75, *Business Systems Requirements and Acquisition,* or Fiscal Year (FY) 2016 National Defense Authorization Act (NDAA) Section 804 Rapid Acquisition guidance. The type and rigor of test should be tailored according to release capability, or the extent to which the release significantly changes legacy system capability. If a software release requires developmental test, prior to conducting developmental test, the Lead Developmental Test and Evaluation Organization will be directly involved with contractor design and development to identify mission related risk as early as possible, then communicate these risks to the Chief Developmental Tester. A risk analysis will be a continuous process conducted by the developmental or operational test organization documenting the degree of risk and potential impact on mission accomplishment for each capability. Since all residual risk ultimately impacts test and may be passed to the end-user, risk analysis must be done early enough to impact the overall initial test strategy or at contract issuance and must be updated periodically throughout design, build, and test phases of the acquisition. The results of this analysis are expected to be part of the program's test plans and will be used to determine the appropriate level of Operational Test and Evaluation required to assess operational effectiveness, suitability, cybersecurity and cyber resiliency. Documentation and coordination requirements can be minimized by identifying, in advance, multiple activities or build phases to be approved at any given milestone or decision point.

1.2.2. Rapid Acquisition—FY16 NDAA Section 804. The essential elements of test and evaluation, while tailorable, apply to Middle-Tier Acquisition rapid prototyping and rapid fielding activities using authorities provided by Section 804 of the FY16 NDAA, Early tester involvement, integrated and synchronized testing, streamlined processes and products, and continuous engagement and feedback allow for rapid learning, correction of system faults and more rapid acquisition. Test rigor and discipline remain critical to the success of rapid prototype and rapid fielding programs.

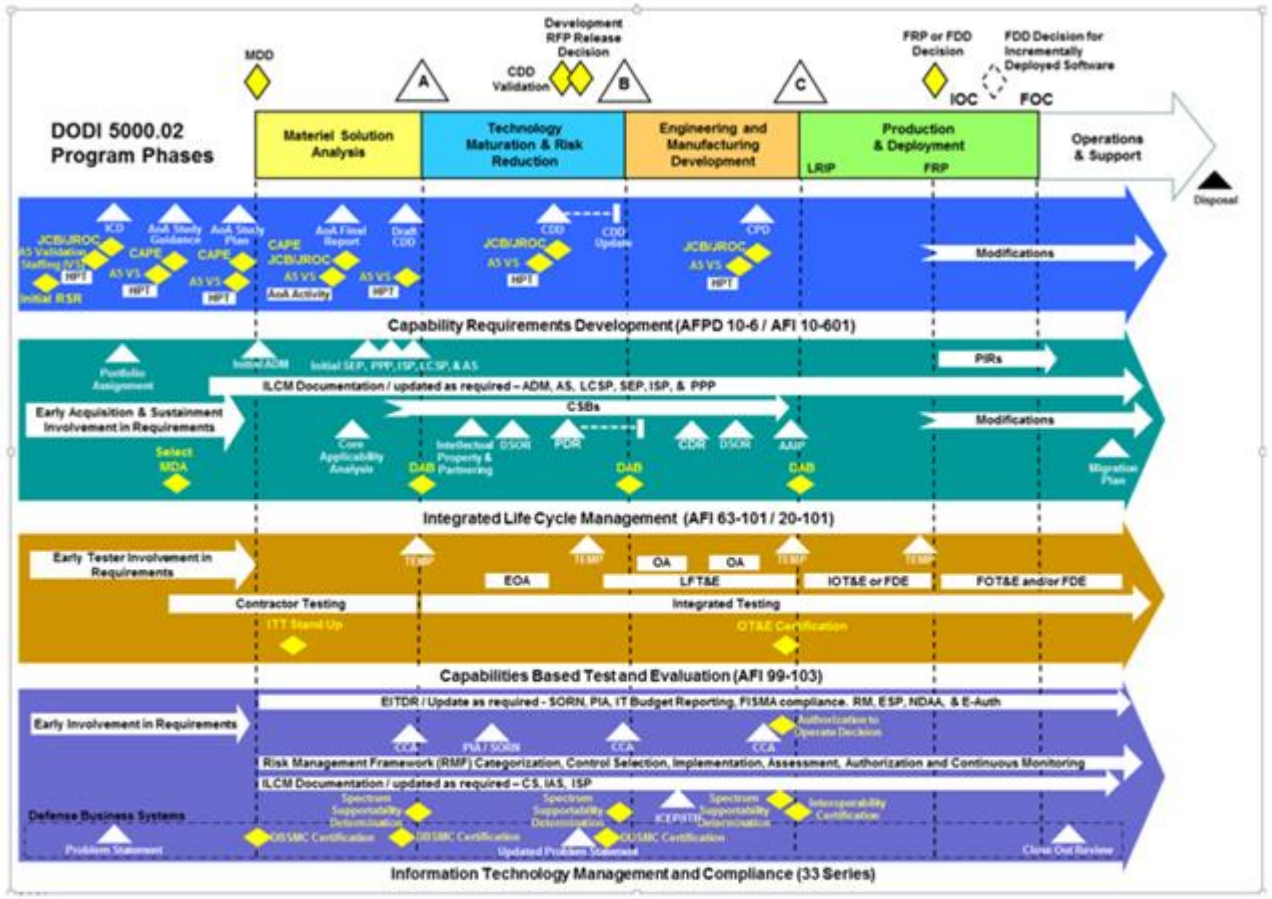
1.2.3. Collaborative Concepts and Processes. Integrated Life Cycle Management is based on concepts and processes described in the AF/A5R Requirements Development Guidebooks, AFI 63-101_20-101, AFI 17-130, *Cybersecurity Program Management*, AFI 17-101, and this AFI. **Figure 1.1** shows the acquisition process as the "master clock" for the integration of requirements, acquisition, information technology activities, and Test and Evaluation events. Sections of **Figure 1.1** are used at the beginning of **Chapter 4, Chapter 5,** and **Chapter 6** to illustrate key events during each acquisition phase. These diagrams represent the full spectrum of processes and events. DoD and AF guidance provides program managers with the flexibility to tailor programs, within certain limits, to meet specific program requirements.

1.2.4. Integrated Warfighting/Cross-Domain Test and Evaluation. The ability to successfully conduct a mission may require the integration of activities and products from a combination of weapon systems, support systems, and enabling systems that operate in multiple domains. Cross-domain testing of interoperable systems is essential in identifying vulnerabilities and evaluating mission performance.

1.2.5. Capabilities-Based Testing. Capabilities-based testing evaluates the capability of the system to effectively accomplish its intended mission in a realistic mission environment in addition to meeting individual technical specifications. The current emphasis on joint military operations in an information-intensive environment means that Air Force systems will seldom operate in combat as completely independent entities. Air Force systems are expected to fully integrate with systems, activities, and products from all services and national agencies. Capabilities-based testing requires a full understanding of joint operational concepts in order to develop test scenarios that will provide meaningful results.

1.2.6. Interoperability, Anti-Tamper, and Cyber Test. Nearly all systems today have information technology content, direct and indirect network connections, interfacing systems, and data exchanges requiring some level of interoperability, anti-tamper, cybersecurity and cyber resiliency testing. The lowest bar in **Figure 1.1** shows additional requirements from the 17-series AFIs for information technology and software-intensive systems as they are integrated with the requirements, acquisition, and Test and Evaluation processes. Interoperability testing, including assessment of the net-ready-key performance parameters, is critical to ensuring interoperable systems; interoperability guidance is found in DoDI 8330.01. Anti-tamper is required on systems with critical program information in accordance with DoDD 5200.47E, *Anti-Tamper (AT)*, and testing of this capability should be coordinated with SAF/AQLS as the Air Force office of primary responsibility. Additionally, system cybersecurity design and cyber test should be considered at program initiation and integrated throughout the acquisition life cycle. Cybersecurity (system and information protection) and the concept of cyber operational resiliency (detection of and recovery from cyber attack) is captured in the *DoD Cybersecurity Test and Evaluation Guidebook*. In this AFI, cyber test includes both cybersecurity testing (system defense against cyber attack) and cyber resiliency testing (system detection and response if defense is defeated).

Figure 1.1. Integration of the Requirements, Acquisition, Information Technology, and Test and Evaluation Process.



Notes:

1. Represents a notional flow and is not all inclusive. Programs may be tailored with approval of the Milestone Decision Authority. See AFI 63-101_20-101.

2. All test-relevant acronyms in this figure are listed in **Attachment 1**.

1.3. General Test and Evaluation Principles. The objective of Test and Evaluation is to provide accurate, objective, and defensible information to the decision makers (e.g., Milestone Decision Authority) to make informed acquisition decisions as well as meet requirements of Title 10 United States Code (USC) Section 2399. Developmental test assesses system compliance with mandated requirements, contracted specifications, and acquisition baselines, and provides such feedback to system developers early in the program. Operational test gauges weapon system performance, in terms of effectiveness and suitability through comprehensive, rigorous test in a realistic operational environment. Efficiencies are gained through integrated testing such as collaborative developmental and operational test planning and execution throughout the program life cycle. The following Test and Evaluation principles are in accordance with DoD 5000-series documents and lessons learned. The unifying theme is that all testers, both developmental and operational, must collaborate to the fullest extent possible to effectively evaluate programs and systems regardless

of organizational affiliation. Because the acquisition process is fluid, testers must ensure the intent of this AFI is implemented at all times.

1.3.1. Tailoring. The Integrated Test Team ensures that all strategies for test and evaluation, concepts, plans, briefings, and reports are flexible and tailored to fit the specific needs of acquisition programs consistent with sound systems engineering practices, program risk, statutory and regulatory guidelines, the time-sensitive nature of users' requirements, and common sense. Reduced documentation and approvals enable accelerated delivery of capabilities; e.g., a single Test and Evaluation Master Plan or Capability Development Document could cover all releases for software intensive programs. If a project or program is authorized to enter the acquisition process at other than the beginning (e.g., entry at Milestone B), the Integrated Test Team reviews all activities that would normally be accomplished prior to that point and ensure any mandatory prerequisites are accomplished.

1.3.2. Pre-Milestone A Tester Involvement. The early provision of Test and Evaluation expertise and technical and operational insight to acquisition professionals and requirements developers, preferably starting before Milestone A, is key to successful initiation of new programs. The earlier the involvement, the greater the opportunity to reduce unintended increases to development, operations, and life cycle costs. Candidate materiel solution approaches are better understood and risks reduced when testers make technical contributions to early acquisition planning activities. Deficiencies must be identified as early as possible to enable resolution, increase program efficiency, and economy of effort. Reference **Paragraph 4.1** for more details on pre-Milestone A guidance.

1.3.3. Event-Driven Schedules and Exit Criteria. Consider cost, schedule, and performance when planning and providing adequate time and resources for all test and evaluation activities in accordance with AFI 63-101_20-101. Test and evaluation activities must demonstrate the system meets established engineering objectives, operational capability requirements, and exit criteria before moving to the next phase of development. The Program Manager will use a Test and Evaluation Master Plan as the primary planning and management tool for the integrated test program. The Program Manager must ensure the system is operationally production representative, stable, and mature before it is certified ready for dedicated operational testing. See AFMAN 63-119, *Certification of System Readiness for Dedicated Operational Testing*, for more details. For programs employing agile software development, refer to **Paragraph 3.9.3**

1.3.4. Integrated Testing. Integrated testing requires collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, evaluation, and reporting by all stakeholders, particularly the Developmental (both contractor and government) and Operational Test and Evaluation communities. Effective Integrated Test Teams plan and execute testing that is integrated across the entire program life cycle including program's requirements generation and system engineering processes to include cybersecurity and cyber resiliency. In addition, Integrated Test Teams evaluate interoperability of a system of systems or family of systems, as applicable, and integrate developmental and operational test. Integrated testing is an efficient test strategy concept for test management and design, not a new type of Test and Evaluation. It structures Test and Evaluation to reduce the time needed to field effective and suitable systems by providing qualitative and quantitative information to decision makers throughout the program's life cycle. Integrated testing minimizes the gaps and can reduce duplicative testing between contractor, developmental, and operational testing

by implementing integrated testing techniques and objectives to the maximum extent possible. Integrated testing does not eliminate dedicated Initial Operational Test and Evaluation required for Major Defense Acquisition Programs and programs on oversight.

1.3.4.1. Integrated testing must be designed into the earliest program strategies, documentation, and test plans, preferably starting before Milestone A for new starts and immediately after the Materiel Development Decision for programs starting post-Milestone A. Test planning must consider the entire life cycle of program activities from technology development through disposal, including testing relevant to manufacturing and sustainment. Test plans must be updated to reflect changing requirements such as in the agile software development process. The earlier integrated testing strategies are developed and adopted, the greater the efficiencies and benefits. If done correctly, integrated testing will identify system design improvements early in system development, reduce the amount of Test and Evaluation resources needed for dedicated Operational Test and Evaluation, and help Program Managers control unintended increases to development, operations, and life cycle costs.

1.3.4.2. Test planning, including cyber and threat test planning, must be integrated with the requirements generation process and the system engineering process, yielding requirements that are testable and achievable as well as test plans that provide actionable capabilities-oriented test results. It requires an understanding of how systems will be employed in operational environments and mandates that strategies for Test and Evaluation and plans be designed to determine whether a new capability solution merits fielding. Furthermore, in light of the joint operational environment, effective test planning and execution integrates with testing of other systems to evaluate interoperability. Proactive planning will allow the Operational Test Organization to use data from Developmental Test for Operational Test when such testing is conducted on a stable system in an operationally relevant environment.

1.3.4.3. Integrated testing may include all types of test activities such as modeling and simulation, contractor testing, developmental and operational testing, interoperability testing of a system of systems or family of systems, as appropriate, agile software development testing, automated testing, cyber testing, and certification testing as described in **Chapter 3**. All types of testing, regardless of the source, should be considered, including tests from other services for multi-Service programs. Tests will be integrated to the maximum extent possible and will use the reciprocity principle as much as possible, i.e., "test by one, use by all." **Note:** This AFI will use the term “integrated testing” to capture this broad intent. “Integrated Developmental Test and Evaluation and Operational Test and Evaluation” is the most common combination, but many other combinations are possible.

1.3.4.4. All testers collaborate as an Integrated Test Team to generate an overarching strategy for Test and Evaluation and test plans that are integrated. These plans must leverage all available test activities and resources while minimizing redundant testing and waste. The result is an integrated test approach with harmonized test plans that efficiently work together throughout the acquisition program, and not necessarily a single test plan. An integrated test strategy must be developed as part of the Test and Evaluation Master Plan when initiating test planning as described in **Paragraph 4.11**, **Paragraph 6.2**, **Paragraph 6.3** and **Paragraph 6.4**. The initial version of the integrated test strategy

should provide an outline of the integrated test approach, validated objectives, and known requirements for all testing on a program, to include initial descriptions of test scenarios, test locations, exercises, test and evaluation methodologies, operational impacts and issues, and projections for future capabilities.

1.3.4.5. Integrated testing must provide appropriate data collection instrumentation and shared data in support of independent analyses for all stakeholders. Shared data provides continuous written feedback from test organizations to the Program Manager and other stakeholders on all aspects of program development. For each program, a common Test and Evaluation database is required according to **Paragraph 5.18.1** that includes descriptions of the test environments and conditions to ensure commonality and usability by other testers. It does not necessarily include the earliest engineering design or data from early prototypes which may not be relevant.

1.3.5. Objectivity. All Air Force Test and Evaluation (AF/TE) activities must be objective, unbiased, and free from outside influences to ensure the integrity of evaluation results in accordance with AFPD 99-1. Air Force programs ensure objective Developmental Test and Evaluation by designating a Lead Developmental Test and Evaluation Organization that is separate from the program office, with case-by-case exceptions for low risk Acquisition Category or Business System Category III programs that are not on any oversight list and have proper Program test representation. An independent Operational Test Organization is assigned to ensure objective Operational Test and Evaluation for all programs.

1.4. Integrated Test Team. The Program Manager establishes an Integrated Test Team as soon as possible after the Materiel Development Decision as shown in **Figure 1.1** to create and manage the strategy for Test and Evaluation for the life of each program. The Integrated Test Team construct is central to carrying out integrated testing and is equivalent to the Test and Evaluation Working-level Integrated Product Team. The Chief Developmental Tester and the lead Operational Test Organization's designated test director co-chair the Integrated Test Team using the general Test and Evaluation principles outlined in **Paragraph 1.3** For non-Major Defense Acquisition Programs and non-Major Automated Information System programs, the term "Test Manager" will be used consistent with AFI 63-101_20-101. **Note:** When this AFI refers to the Chief Developmental Tester, it also includes the Test Manager. Chief Developmental Testers and/or Test Managers will advise the Program Manager and the Integrated Test Team. Integrated Test Team membership includes all organizations needed to implement a comprehensive and integrated test strategy for as long as Test and Evaluation is needed. Typical Integrated Test Team member organizations are described in **Paragraph 4.4.4**. Also see the *Air Force Test and Evaluation Guide* for details on Integrated Test Team structure, responsibilities, charters, and functions. The Guidebook is available on the Directorate of AF/TE portion of the Air Force Portal **https://haf-te.sharepoint.afncr.af.mil/SitePages/Home.aspx**.

1.5. Document Organization. This AFI follows the acquisition process phases in AFI 63-101_20-101 as shown in **Figure 1.1**. **Chapter 4, Chapter 5,** and **Chapter 6** contain direction most pertinent to achieving the goals of Milestones A, B, and C respectively. Each chapter's activities typically support that particular Milestone or phase, but depending on program needs, may be partially completed or even deferred to the next phase. The sequence of activities presented generally follows the flow of **Figure 1.1**, but in all cases, planning for each area should be started as early as practical. **Note:** Programs that enter the acquisition process after Milestone A must accomplish the necessary "stage-setting" activities specified for the preceding milestones in

Chapter 4 and **Chapter 5**. **Note**: Testing of Defense Business Systems should follow **Paragraph 4.16**.

1.6. Applicability and Authority. The policies and processes in this AFI apply to AF Test and Evaluation organizations and all programs, projects, experiments, and activities that support Integrated Life Cycle Management. These include, but are not limited to, acquisition, Defense Business System programs, MAJCOM-directed acquisition, sustainment and modification programs, projects, and activities. These policies and processes apply regardless of funding source or Acquisition Category level, unless otherwise noted. See DoDI 5000.02, Enclosure 1, and DoDI 5000.75, **Table 1**, for details on Acquisition Categories and Business System Categories, respectively. Air Force Special Access Programs and other sensitive programs (e.g., BIG SAFARI projects) will follow the intent of this AFI to the extent that security considerations allow. When the Air Force is not the lead Service for test, Air Force testers follow the lead Service's or Joint Test and Evaluation policies. Joint Test and Evaluation of nuclear weapons systems and nuclear weapons systems components will be governed by this AFI unless otherwise specified by the joint Memorandum of Understanding developed by the Air Force and Department of Energy. Exceptions to policy will be coordinated with SAF/AAZ, Security and Special Program Oversight, SAF/AQL, Special Programs, SAF/AQI, Information Dominance, or AF/TE, as applicable. **Note**: In this AFI, guidance provided for "MAJCOM" test activities shall be understood to apply also to Field Operating Agencies and Direct Reporting Units test activities (except the Air Force Operational Test and Evaluation Center (AFOTEC)).

1.6.1. Hierarchy of Authority. Authority for this AFI flows from AFPD 99-1. Specific details for implementing this policy are delegated to, and more appropriately developed by, Air Force MAJCOMs, Field Operating Agencies, and Direct Reporting Units, and their subordinate designated Test and Evaluation organizations based on specific mission areas and needs.

1.6.2. Hierarchy of Knowledge Management. It is not possible for this AFI to prescribe detailed Test and Evaluation policy and tactics, techniques, and procedures for each of the Air Force's many mission areas, programs, and Test and Evaluation activities. Therefore, all Test and Evaluation organizations must establish tailored, disciplined, and collaborative processes for planning, executing, and reporting Test and Evaluation activities.

1.6.3. Qualification of Test Personnel. A highly trained and qualified Test and Evaluation workforce is required to apply the Test and Evaluation principles in **Paragraph 1.3** to acquisition programs. Government personnel performing tests should be at least Acquisition level 1 Test and Evaluation certified. Government personnel managing or directing tests at test organizations and personnel performing acquisition test management duties at a program office should have at least two years of test experience and preferably an Acquisition Level 2 Test and Evaluation certification.

1.7. Areas Not Covered by this AFI. The systems, programs, and activities listed in the sub-Paragraphs below are not within the purview of this AFI. Activities exempted from this AFI will follow its intent as much as possible while balancing the missions of the Space Test Program and science and technology programs.

1.7.1. Activities associated with the space experimentation program described in AFI 10-1202, *Space Test Program (STP) Management*.

1.7.2. The management procedures of this AFI do not apply to science and technology programs or projects, which are managed in accordance with AFI 61-101, *Management of Science and Technology*. However, when science and technology activities are conducted post Milestone A or under the authority of a Program Executive Officer, the exemption no longer applies unless specifically authorized by AFMC/A3 or AFSPC/TE, as applicable. Non-program of record technology developments that are left behind as an operational capability must undergo a Military Utility Assessment (or similar testing) to characterize the operational usefulness of the "leave-behind."

1.8. Compliance Items. Each unit (wing or equivalent, and below, Direct Reporting Units, Field Operating Agencies) compliance item is identified with a Tier waiver authority number. A "**T-0**" denotes a requirement external to the United States Air Force (USAF); requests for waivers must be processed through command channels to AF/TEP for consideration. For "**T-1**" items, the waiver authority is the MAJCOM/CC (delegable no lower than the MAJCOM Director), with the concurrence of AF/TE. The AFOTEC/CC is delegated waiver authority for AFOTEC "**T-1**" compliance items with concurrence of AF/TE. Mandates to the acquisition execution chain are not considered Wing level mandates and tiering does not apply. When tiering does apply for wing/unit level requirement, waiver authority is identified with a Tier ("**T-0**, **T-1**, **T-2**, and **T-3**") number following the compliance statement.

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. Overview of Responsibilities. All Air Force testers, to include test execution organization personnel and program office test management personnel, will follow the Test and Evaluation principles articulated in **Chapter 1** of this AFI using the types of tests described in **Chapter 3**. Testers must collaborate with each other, the broader acquisition community, requirements sponsors, and system developers using the Integrated Test Team as the Test and Evaluation focal point for each program.

2.2. Director, Operational Test and Evaluation (DOT&E). DOT&E responsibilities are described in DoDD 5141.02, *Director of Operational Test and Evaluation (DOT&E)*.

2.3. Deputy Director for Developmental Test, Evaluation, and Prototyping (DD(DTE&P)). Conduct Developmental Test and Evaluation Sufficiency Assessments as part of the Milestone B and Milestone C brief summary reports for Major Defense Acquisition Programs where the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) is the Milestone Decision Authority in accordance with AFI 63-101_20-101. Additional DD(DTE&P) responsibilities are described in DoDI 5134.17, *Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E))*.

2.4. Headquarters, U.S. Air Force, Director of Test and Evaluation (AF/TE). AF/TE will:

2.4.1. Function as the chief test and evaluation advisor to Air Force senior leadership in accordance with Headquarters Air Force Mission Directive (HAFMD) 1-52, *Director of Test and Evaluation*. Be responsible to the Chief of Staff of the Air Force for establishing AF/TE policy, advocating for test and evaluation resources required to support weapons system development and sustainment, and resolving test and evaluation issues and disputes.

2.4.2. Act as the final Air Staff test and evaluation review authority and signatory for Test and Evaluation Master Plans (to include Request for Proposal Test and Evaluation Master Plan) prior to Service Acquisition Executive approval and signature. AF/TE will approve/sign Test and Evaluation Master Plans for Acquisition Category I programs and any program on DOT&E oversight. **Note**: The term Service Acquisition Executive is equivalent to the term Component Acquisition Executive used in DoD directives and instructions.

2.4.3. Collaborate with requirements sponsors and system developers to improve the development, testing, and fielding of Air Force systems or subsystems. Participate in high performance teams, Integrated Test Teams, and integrated product teams as necessary to help ensure program success.

2.4.4. Respond to and mediate Air Force test and evaluation issues between HQ USAF principals, MAJCOMs, Air Force testers, the services, Office of the Secretary of Defense (OSD), and Congress.

2.4.5. Review and/or prepare test and evaluation information for release to OSD and ensure timely availability of test and evaluation results to decision makers.

2.4.6. Oversee the Air Force test and evaluation infrastructure and ensure adequate facilities are available to support Air Force test and evaluation activities. Administer various test and

evaluation resource processes and chair or serve on various committees, boards, and groups listed in HAFMD 1-52.

2.4.7. Act as the Air Force Foreign Materiel Program Executive Agent and point of contact for the Air Staff and other governmental agencies and organizations in accordance with AFI 99-114-S, *Foreign Materiel Program (U).*

2.4.8. Serve as the Cross Functional Authority for test and evaluation personnel managed in accordance with the Air Force Acquisition Professional Development Program and in accordance with DoDI 5000.66, *Defense Acquisition, Workforce Education, Training, and Career Development Program*. AF/TE, in collaboration with SAF/AQ and other functional authorities, functional managers and career field managers, will manage the development of a pool of qualified test and evaluation personnel to fill Critical Acquisition Positions, including Key Leadership Positions.

2.4.9. Provide advice on Integrated Test Team charter development and membership requirements. Review Integrated Test Team charters for programs on OSD oversight.

2.4.10. Manage the Air Force Joint Test and Evaluation Program (see **Table 3.2**) and represent the Air Force at the Joint Test and Evaluation Executive Steering Group, Senior Advisory Council, and Technical Advisory Board in accordance with DoDI 5010.41, *Joint Test and Evaluation Program*, and AFI 99-106, *Joint Test and Evaluation (JT&E) Program*.

2.4.10.1. The Air Force Joint Test Program Office (AFJO) is accountable to United States Air Force Warfare Center (USAFWC) Commander to ensure adequate support of the joint operational testing program as described in DoDI 5010.41. AFJO executes the AF Joint Test and Evaluation program on behalf of AF/TE per AFI 99-106.

2.4.10.2. AFJO is designated the Operational Test Agency and is limited to administering and executing tests within the AF Joint Test and Evaluation Program, including Joint Tests, Joint Feasibility Studies, Quick Reaction Tests, and Collaborative Joint Tests.

2.4.11. Conduct Sufficiency of Developmental Test and Evaluation Assessments as part of the Milestone B and Milestone C brief summary reports for Major Defense Acquisition Programs where the Service Acquisition Executive is the Milestone Decision Authority in accordance with Directive-Type Memorandum (DTM) 19-007, *"Developmental Test and Evaluation Sufficiency Assessments."*

2.4.12. Provide policy, guidance, and oversight of all modeling and simulation in support of test and evaluation.

2.4.13. Perform other duties listed in HAFMD 1-52.

2.5. Assistant Secretary of the Air Force for Acquisition, Technology and Logistics (SAF/AQ). SAF/AQ is the Air Force Service Acquisition Executive, and is responsible for all acquisition functions within the Air Force. SAF/AQ will:

2.5.1. Ensure systems are certified ready for dedicated operational testing according to **Paragraph 6.5.1** and AFMAN 63-119. Although AFMAN 63-119 requires the Service Acquisition Executive to evaluate and determine system readiness for Initial Operational Test and Evaluation, the Service Acquisition Executive may delegate this authority in writing to a lower milestone decision authority for the program, such as a Program Executive Officer.

2.5.2. Ensure test and evaluation responsibilities are documented as appropriate in Test and Evaluation Master Plans, Acquisition Strategies, System Engineering Plans, Life Cycle Sustainment Plans, Program Protection Plans, and other program documentation. Per SAF/AQE business rules, the Program Executive Officer delivers the Staff Summary Sheet and draft acquisition documents to SAF/AQE for Headquarters Air Force (HAF) review.

2.5.3. Regarding Live Fire Test and Evaluation, SAF/AQ or designated representatives will:

2.5.3.1. Recommend candidate systems to DOT&E for compliance with Live Fire Test and Evaluation legislation after coordinating the proposed nominations with AF/TE.

2.5.3.2. Approve Live Fire Test and Evaluation strategies and Air Force resources required to accomplish Live Fire Test and Evaluation plans and forward to DOT&E. Forward Full Up System Level Live Fire Test and Evaluation waivers (and legislative relief requests, if appropriate) to DOT&E, if required. See **Paragraph 5.8.4** for details.

2.5.4. Approve and sign Test and Evaluation Master Plans for all Acquisition Category I, IA, Business System Category, and other programs on OSD Test and Evaluation Oversight. Forward these Air Force-approved Test and Evaluation Master Plans to DOT&E and DD(DTE&P) for final OSD approval.

2.5.5. Ensure leaders knowledgeable of test and evaluation policies and requirements are selected for Major Defense Acquisition Programs and Major Automated Information System programs. SAF/AQ or a designated representative will:

2.5.5.1. Ensure that a Chief Developmental Tester is designated for each Major Defense Acquisition Program and Major Automated Information System program.

2.5.5.2. Ensure that Defense Acquisition Workforce Improvement Act Test and Evaluation acquisition-coded Chief Developmental Tester positions for Major Defense Acquisition Programs and Major Automated Information System programs are designated as Key Leadership Positions in accordance with the Under Secretary of Defense (Acquisition and Sustainment) (USD(A&S)) Key Leadership Position policy, including DoDI 5000.66. The occupant of this Chief Developmental Tester position must be appropriately qualified in accordance with AFI 63-101_20-101, AFI 36-1301, *Management of Acquisition Key Leadership Positions,* USD(A&S)'s *Key Leadership Positions and Qualification Criteria* memo, and AF/TE policy and guidance.

2.5.6. Develop and implement plans to ensure the Air Force has provided appropriate resources for developmental testing organizations with adequate numbers of trained personnel in accordance with the Weapon Systems Acquisition Reform Act of 2009, Public Law 111-23 §102(b)(1).

2.5.7. Review anti-tamper validation and verification and test plans as the Air Force anti-tamper office of primary responsibility (SAF/AQLS).

2.6. Headquarters, U.S. Air Force, Deputy Chief of Staff for Intelligence, Surveillance, Reconnaissance and Cyber Effects Operations (AF/A2/6). AF/A2/6 will:

2.6.1. Ensure appropriate AF/A2/6 personnel participate early in Integrated Test Teams as soon as they are formed for acquisition and sustainment programs with Intelligence, Surveillance, and Reconnaissance (ISR) capabilities.

2.6.2. Include adequate and recurring test and evaluation of ISR systems in AF ISR policies.

2.6.3. Review test and evaluation-related documentation to ensure cyber testing fully supports system acquisition, fielding and sustainment.

2.6.4. Develop and implement Risk Management Framework oversight policy for ISR Action Officers (AO) to support cyber test infrastructure requirements.

2.7. Headquarters, U.S. Air Force, Deputy Chiefs of Staff for Operations, Plans, and Requirements (AF/A3) and for Strategy, Integration and Requirements (A5). AF/A3 and A5 will ensure appropriate AF/A3 and A5 personnel support Integrated Test Teams and participate in development of strategies for test and evaluation.

2.8. Secretary of the Air Force, Chief Information Officer (SAF/CIO). SAF/CIO will:

2.8.1. Ensure appropriate SAF/CIO personnel participate early in Integrated Test Teams as soon as they are formed for acquisition and sustainment programs with information technology and national security system capabilities.

2.8.2. Develop and implement security and cybersecurity policies that include adequate and recurring test and evaluation of information technology and national security systems in accordance with DoDI 5200.39, *Critical Program Information (CPI) Identification and Protection Within Research, Development, Test and Evaluation (RDT&E)*, DoDI 5200.44, *Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN*), DoDI 5000.02, and AFI 63-101_20-101.

2.8.3. Partner with the requirements, acquisition, and test and evaluation communities to ensure planned capabilities are tested to satisfy net-centric, security, cybersecurity, and cyber resiliency requirements as shown in **Figure 1.1** and **Table 3.2**.

2.8.3.1. Working with AF/TE, advocate for funding for identified test and evaluation infrastructure and interoperability certification test.

2.8.3.2. Identify qualified and/or certified organizations for planning and conducting cyber test.

2.8.4. Review test and evaluation-related documentation to ensure interoperability certification testing, security testing, and cyber testing fully support system acquisition, fielding, and sustainment according to **Paragraph 4.14**, **Paragraph 5.10**, **Paragraph 5.14**, and **Table 3.2**.

2.8.5. Implement measures to ensure net-ready-key performance attribute, including the associated key interface profiles, are clearly defined in the system architecture, and are interoperable, resourced, tested, and evaluated according to the Air Force Enterprise Architecture, AFI 17-140, *Architecting*, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 5123.01H, *Charter of the Joint Requirements Oversight Council (JROC) and Implementation of the Joint Capabilities Integration and Development System (JCIDS)*, and OSD, Joint Chiefs of Staff, and Joint Interoperability Test Command (JITC) policies.

2.8.6. Facilitate security, net-readiness, and interoperability certifications as early as practical. Assist in the certification of readiness for operational testing in accordance with AFMAN 63-119.

2.8.7. Provide net-worthiness recommendations for test and evaluation of information technology systems.

2.8.8. Establish and implement procedures to ensure interoperability test, evaluation, and certification of information technology before connection to a DoD network in accordance with DoDI 8330.01.

2.8.8.1. Ensure test and evaluation-related data that supports interoperability certification testing, acquisition, fielding, and sustainment are documented in the system's Information Support Plan, in accordance with DoDI 8330.01.

2.8.8.2. Designate a representative to the DoD Interoperability Steering Group to coordinate with program offices and the JITC on Interim Certificates to Operate for systems experiencing delays in required interoperability certification testing and other related actions.

2.8.9. Develop and implement Risk Management Framework oversight policy for AOs to support cyber test infrastructure requirements.

2.9. Headquarters, Air Force Materiel Command (AFMC). HQ AFMC will:

2.9.1. Develop AFMC Developmental Test and Evaluation guidance, procedures, and Memorandums of Agreement for non-space programs in assigned mission areas to supplement this AFI. Forward draft copies to AF/TEP Workflow (**usaf.pentagon.af-te.mbx.af-tep-workflow@mail.mil**) and SAF/AQXS workflow (**usaf.pentagon.saf-aq.mbx.saf-aqxs-policy-workflow@mail.mil**) for review prior to publication.

2.9.1.1. **(Added-AFMC)** AFMC A3/6 is HQ Senior Functional for T&E.

2.9.1.1.1. **(Added-AFMC)** Will ensure proper control and accountability for aerospace vehicles, missiles, munitions, and aerial targets involved in test and test support IAW AFI 16-402, AFI 21-103, AFI 99-108, and AFI 99-120.

2.9.1.1.2. **(Added-AFMC)** Provides T&E-based direction and guidance to AFMC/SE regarding Chapter 13 of AFI 91-202_AFMCSUP *Air Force Mishap Prevention Program*.

2.9.2. Ensure nuclear weapon system test and evaluation policies and issues are managed in accordance with AFI 63-125, *Nuclear Certification Program*. Assist with development and approval of nuclear weapon subsystem test plans.

2.9.3. Establish and provide for Developmental Test and Evaluation training, organization, and test and evaluation infrastructure resources.

2.9.4. Assist the Program Manager and Integrated Test Team in identifying key government Developmental Test and Evaluation organizations, to include selection of Lead Developmental Test and Evaluation Organization candidates, Chief Developmental Testers, and Test Managers, in compliance with **Paragraph 2.5.5.2**, as soon as possible after the Materiel Development Decision according to **Paragraph 4.4** and **Paragraph 4.5**. Participate in Integrated Test Teams and Test Integrated Product Teams as necessary.

2.9.5. Establish policy for test and evaluation focal points (e.g., on-site test authority or equivalent office) that provide test and evaluation support and advice with respect to test programs and projects to acquisition and test and evaluation practitioners at centers and

complexes. These test and evaluation focal points will address test and evaluation needs at all program management reviews.

2.9.6. Conduct long-range planning to ensure test and evaluation infrastructure and processes are in place to support required testing.

2.9.7. Ensure centers and complexes participate in test and evaluation resource investment planning processes.

2.9.8. Review and coordinate on test plans, test reports, and test-related correspondence for programs on OSD Test and Evaluation Oversight.

2.9.9. Develop and maintain a qualified Developmental Test and Evaluation workforce for test execution at test organizations and acquisition test management within program offices.

2.9.10. Oversee and inspect AFMC compliance with this instruction.

2.9.11. Develop and publish Lead Developmental Test and Evaluation Organization qualifications and Lead Developmental Test and Evaluation Organization candidate list for AFMC acquisition programs.

2.9.12. Ensure Research, Development, Test and Evaluation representation at pre-Materiel Development Decision activities to assist in early development of operational requirements and enabling or operating concepts, early development of the strategy for test and evaluation, cyber strategy, and early acquisition planning in accordance with AF/A5R Requirements Development Guidebooks, AFI 63-101_20-101, and this AFI. Identify organizations responsible for these activities. AFMC has Research, Development, Test and Evaluation support staff that should be supporting the pre-Materiel Development Decision early systems engineering analyses.

2.9.13. Provide oversight of the Developmental Test and Evaluation Sufficiency Assessment and certification of readiness for Operational Test per DTM 19-007 and AFMAN 63-119.

2.9.14. Approve the Lead Developmental Test and Evaluation Organization.

2.10. Headquarters, Air Force Space Command (AFSPC). HQ AFSPC will:

2.10.1. Develop HQ AFSPC test and evaluation guidance, procedures, and Memorandums of Agreement for space programs to supplement this AFI. Forward draft copies to AF/TEP Workflow (**usaf.pentagon.af-te.mbx.af-tep-workflow@mail.mil**) and SAF/AQXS workflow (**usaf.pentagon.saf-aq.mbx.saf-aqxs-policy-workflow@mail.mil**) for review prior to publication.

2.10.2. Establish and provide for space-related Developmental Test and Operational Test training, organization, and test and evaluation infrastructure resources.

2.10.3. Assist the Program Manager and Integrated Test Team in identifying key government Developmental Test and Evaluation organizations for space programs, to include selection of Lead Developmental Test and Evaluation Organization candidates, Chief Developmental Testers, and Test Managers as soon as possible after the Materiel Development Decision according to **Paragraph 4.4** and **Paragraph 4.5** Participate in Integrated Test Teams and Test Integrated Product Teams as necessary.

2.10.4. Establish policy for and maintain a test and evaluation focal point (e.g., test authority or equivalent office) that provides test and evaluation support and advice to acquisition and test and evaluation practitioners at the command's product center. These test and evaluation focal points will address test and evaluation needs at all program management reviews.

2.10.5. Conduct long-range planning to ensure test and evaluation infrastructure and processes are in place to support required testing.

2.10.6. Ensure HQ AFSPC and Space and Missile Systems Center (SMC) participation in test and evaluation resource investment planning processes. Advocate for and procure space and Defensive Cyber Operations for space test and evaluation infrastructure, resources, and requirements.

2.10.7. Review and coordinate on test plans, test reports, and test-related correspondence for programs on OSD Test and Evaluation Oversight.

2.10.8. Develop and maintain a qualified Developmental Test and Evaluation and Operational Test and Evaluation workforce. Apportion space-qualified Operational Test and Evaluation workforce to Air Combat Command (ACC) as requested.

2.10.9. Oversee and inspect AFSPC compliance with this instruction.

2.10.10. Implement the test and evaluation policies in DoDI S-3100.15, *Space Control (U)*, for space control systems and lead test activities associated with the implementation of DoDI 8100.04, *DoD Unified Capabilities (UC)*, for the Air Force.

2.10.11. Ensure Research, Development, Test and Evaluation representation at pre-Materiel Development Decision activities to assist in early development of operational requirements and enabling or operating concepts, early development of the strategy for test and evaluation, cyber strategy, and early acquisition planning in accordance with AF/A5R Requirements Development Guidebooks, AFI 63-101_20-101, and this AFI. Identify organizations responsible for these activities. AFSPC (at SMC) has Research, Development, Test and Evaluation support staff that should be supporting the pre-Materiel Development Decision early systems engineering analyses.

2.10.12. Review, coordinate and approve Integrated Test Team and Combined Test Force charters for space weapon systems and programs of record (new/updates).

2.10.13. Approve Lead Developmental Test and Evaluation Organization for space programs.

2.11. Operational MAJCOMs, Direct Reporting Units, and Field Operating Agencies. MAJCOMs, Direct Reporting Units, and Field Operating Agencies will:

2.11.1. Develop test and evaluation guidance, procedures, and Memorandums of Agreement to supplement this AFI. Forward draft copies to AF/TEP and SAF/AQXA Workflow addresses for review prior to publication. Assist Operational Test Organizations in determining the resources and schedule for Operational Testing. Ensure systems engineering considerations, as identified by the Program Office, (including, but not limited to environment, safety, and occupational health; human systems integration; maintenance/sustaining engineering; product and system integrity; and software engineering) are addressed in all Initial Capability Documents, Capability Development Documents, and Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy Change Recommendations, as appropriate. The lead command will advocate for and carry out test and

evaluation responsibilities for assigned weapon systems during their life cycle in accordance with AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*. **(T-1).**

2.11.2. Perform the responsibilities in **Paragraph 2.11.3** through **Paragraph 2.11.16** when designated the Operational Test Organization according to **Figure 4.3**. **(T-1).**

2.11.3. Collaborate with requirements sponsors and system developers to execute the development, testing, and fielding of Air Force systems and subsystems. Develop clear and testable operational requirements and approved enabling and operating concepts prior to Milestone B. Keep these documents current to support the most current phases of Test and Evaluation. See **Paragraph 2.7** Participate in High Performance Teams, Integrated Test Teams, and Test Integrated Product Teams as necessary to help ensure program success. **(T-1).**

2.11.4. Review and coordinate on Test and Evaluation-related documentation impacting MAJCOM systems under test. **(T-1).**

2.11.5. Oversee the test and evaluation policies and activities of assigned test and evaluation organizations to ensure compliance with HQ USAF, OSD, and MAJCOM test and evaluation policies. **(T-1).**

2.11.6. Advocate for test resources. **(T-1).**

2.11.7. Ensure appropriate and adequate test and evaluation training is provided for personnel involved in test and evaluation activities. **(T-1).**

2.11.8. Provide support for the OSD-sponsored Joint Test and Evaluation Program and joint test projects in accordance with AFI 99-106 and the approved Test Resource Plan. **(T-1).**

2.11.9. Ensure operational testing (e.g., Operational Assessments, Operational Utility Evaluations, and Force Development Evaluations) is planned, conducted, and results reported for assigned systems and programs when AFOTEC is not involved according to **Paragraph 4.4.7** and **Paragraph 4.6**. **(T-1).**

2.11.10. Support AFOTEC-conducted Operational Test and Evaluation as agreed by the Integrated Test Team, Test Integrated Product Teams, and documented in Test Resource Plans and Test and Evaluation Master Plans. **(T-1).**

2.11.11. Continue operational testing of acquisition programs according to **Paragraph 3.5.4** through **Paragraph 3.5.11,** and **Paragraph 4.6** When applicable, provide information to DOT&E according to **Paragraph 4.7, Paragraph 4.11.3.2, Paragraph 6.6, Paragraph 6.7, Paragraph 7.4,** and **Attachment 2**, Information Requirements for OSD Test and Evaluation Oversight Programs. **(T-0).**

2.11.12. Coordinate fielding recommendations and fielding decisions with the system Program Manager and Operational Test Organization to support full rate production decisions. **(T-1).**

2.11.13. Support Program Managers, working with the Chief Developmental Tester and/or Test Manager with the process to certify systems ready for dedicated operational testing in accordance with AFMAN 63-119. **(T-1).**

2.11.14. Identify and report deficiencies in accordance with Technical Order (TO) 00-35D-54, *USAF Deficiency Reporting, Investigation, and Resolution*. Monitor open Deficiency Reports from earlier testing. **(T-0).**

2.11.15. Conduct Tactics Development and Evaluation and Weapons System Evaluation Program to characterize and/or enhance operational capabilities. **(T-1).**

2.11.16. Request AFOTEC assistance and/or involvement as needed.

2.11.17. HQ ACC will also:

2.11.17.1. Develop HQ ACC guidance, procedures, and memorandums of agreement for cyberspace programs to supplement this AFI. Forward draft copies to AF/TEP Workflow (**usaf.pentagon.af-te.mbx.af-tep-workflow@mail.mil**) and SAF/AQXS workflow (**usaf.pentagon.saf-aq.mbx.saf-aqxs-policy-workflow@mail.mil**) for review prior to publication.

2.11.17.2. Establish and provide for cyber-related operational test training, organization, and test and evaluation infrastructure resources.

2.11.17.3. Establish and maintain capability to conduct operational test of cyber warfare capabilities, cyber operations capabilities, and evaluated level of assurance testing; see DoDI O-3600.03, *Technical Assurance Standard (TAS) for Computer Network Attack (CNA) Capabilities*.

2.12. Air Force Operational Test and Evaluation Center (AFOTEC). AFOTEC will:

2.12.1. Develop AFOTEC guidance, procedures, and memorandums of agreement for operational testing to supplement this AFI. Forward draft copies to AF/TEP Workflow and SAF/AQXS Workflow prior to publication.

2.12.2. Carry out the responsibilities of the Air Force independent Operational Test Agency described in Air Force Mission Directive (AFMD) 14, *Air Force Operational Test and Evaluation Center* (AFOTEC), and AFPD 99-1.

2.12.3. As the Air Force Operational Test Agency for programs as determined in **Paragraph 4.6**, monitor Air Force acquisition programs for operational test applicability and provide formal notice of AFOTEC involvement to program stakeholders when warranted. Provide timely responses and inputs to support program schedules. Function as the lead Operational Test Agency for multi-Service programs, when designated, and coordinate with other services' Operational Test Agencies.

2.12.4. Program for AFOTEC conducted test and evaluation activities and list costs, schedules, and resources in test resource plans. Coordinate Air Force portion of multi-service Operational Test and Evaluation resources where the Air Force is not the Lead Operational Test Agency. Coordinate Test Resource Plans with supporting organizations in sufficient time for funds and personnel to be budgeted during the Program Objective Memorandum cycle.

2.12.5. Generate Operational Assessments and dedicated Operational Test reports to support key acquisition decisions.

2.12.6. Generate Observation Reports and/or Quick Look Briefings to provide continuous written feedback to the Program Manager and other stakeholders to inform all aspects of program development.

2.13. USAFWC. The USAFWC will exercise "coordinating authority" for operational testing as defined in the USAFWC Charter as follows:

2.13.1. Initiate dialogue and close collaboration with MAJCOMs to ensure priorities for operational testing are synchronized and candidates for collaborative testing are identified.

2.13.2. Coordinate with and support AFOTEC-conducted operational testing for weapon systems' initial acquisition and fielding decisions as requested.

2.13.3. Identify and help eliminate redundant operational test activities.

2.13.4. Sponsor, oversee, and execute comprehensive integrated warfighting/cross-domain test and evaluation activities to enhance operational capabilities.

2.14. Operational Test Organizations. AFOTEC as the Operational Test Agency and other Operational Test Organizations as determined in **Paragraph 4.6** will:

2.14.1. Help form and co-chair (with the Chief Developmental Tester or Test Manager, as appropriate) Integrated Test Teams for programs as determined in **Paragraph 4.6**. The Integrated Test Team must be formed as early as possible, preferably immediately after the Materiel Development Decision according to **Paragraph 2.16.3** and **Paragraph 4.4**. **(T-1).**

2.14.2. Participate in High Performance Teams as necessary to ensure testability of capability requirements attributes (i.e., Key Performance Parameters, Key System Attributes, and Additional Performance Attributes). Assist in development of capability requirements documents and enabling and operating concepts, Courses of Action, and Analyses of Alternatives.

2.14.3. Participate in preparation of strategies for test and evaluation and test plans that are integrated. Prepare the Operational Test and Evaluation portions of the Test and Evaluation Master Plan and coordinate Operational Test strategy inputs with OSD/DOT&E for Acquisition Category ID and OSD-oversight programs.

2.14.4. Collaborate with other Operational Test Organizations and AF/TEP to ensure operational testing is conducted by the appropriate test organization(s) according to **Paragraph 4.6**. **(T-1).**

2.14.5. Provide independent operational testing expertise and level of support to Force Development Evaluations as negotiated. **(T-1).**

2.14.6. Plan and conduct operational testing in support of Air Force-sponsored rapid acquisition programs, Quick Reaction Capabilities, and Urgent Operational Needs. See **Paragraph 4.17** **(T-1).**

2.14.7. Use approved Concept of Operations, Operating Concepts, Mission Profiles, etc. along with validated capability requirements attributes (Key Performance Parameter, Key System Attributes, and Additional Performance Attributes) as the primary source of evaluation criteria. Report results as directed in **Chapter 7**. **(T-1).**

2.14.8. Determine the quantity of test articles required for Operational Test and Evaluation in consultation with the MAJCOM and the Program Manager in accordance with 10 U.S.C. §2399. **(T-0).**

2.14.9. Participate in the certification of readiness for dedicated operational testing in accordance with AFMAN 63-119. **(T-1).**

2.14.10. Identify, validate, submit, track, and prioritize system deficiencies and enhancements in accordance with TO 00-35D-54. **(T-1).**

2.14.11. Mark and handle cybersecurity vulnerabilities according to appropriate security classification guidance.

2.14.12. Maintain a qualified Operational Test and Evaluation workforce. **(T-1).**

2.14.13. Ensure test and evaluation training is provided for personnel involved in operational test activities. **(T-1).**

2.14.14. Submit significant test event reports to the appropriate agencies (e.g., Program Manager, Chief Developmental Tester, Test Manager, Lead Developmental Test and Evaluation Organization, Participating Test Organizations (Participating Test Organizations), operational MAJCOM, Program Element Monitor, Program Executive Officer, Center Test Functional leaders, AF/TE, and/or DOT&E). **(T-1).**

2.14.15. Participate in program Agile DevOps collaborative planning events on a regular basis. **(T-1)**.

2.15. Program Executive Officer. The Program Executive Officer will:

2.15. (AFMC) Program Executive Officer. The Program Executive Officer (or, in Centers without a Program Executive Officer, the Center Commander (or designated representative) is the approval authority for test-related activities. **(T-2)**.

2.15.1. Assist the Program Manager and Integrated Test Team in identifying key government Developmental Test and Evaluation organizations and personnel, to include Lead Developmental Test and Evaluation Organization candidates, Chief Developmental Testers, and Test Managers as soon as possible after the Materiel Development Decision according to **Paragraph 4.4** and **Paragraph 4.5**

2.15.2. Concur on each program's Integrated Test Team's nominated Lead Developmental Test and Evaluation Organization selection prior to AFMC/A3 or AFSPC/TE approval, as applicable.

2.15.3. Act as final field-level approval authority prior to forwarding Test and Evaluation Master Plans to SAF/AQ and AF/TE for final Air Force coordination and approval and approve Test and Evaluation Master Plans when assigned as Milestone Decision Authority and program is not on OSD oversight or OSD has waived their formal coordination authority. See **Paragraph 4.11.3.2**.

2.15.4. Act as the Operational Test and Evaluation Certification Official for delegated programs according to AFMAN 63-119 and **Paragraph 6.5** of this AFI.

2.16. Program Managers. The Program Manager (or designated test and evaluation representative) will:

2.16.1. Appoint a qualified Chief Developmental Tester or Test Manager to a Defense Acquisition Workforce Improvement Act Test and Evaluation acquisition-coded position in

accordance with DoDI 5000.66 to manage all Developmental Test and Evaluation for the program office. **(T-0).**

2.16.1.1. **(Added-AFMC)** Contractors shall not be a program's Chief Developmental Tester or a lead Test Manager. These positions direct/manage/approve test planning decisions for the government and as such are inherently governmental positions. **(T-2)**.

2.16.2. Determine whether the assigned program is on DOT&E oversight and/or on the DD(DTE&P) special interest or engagement list and adjust program manpower accordingly.

2.16.3. Ensure that Chief Developmental Tester and/or Test Manager forms an Integrated Test Team with the selected lead Operational Test Organization immediately after the Materiel Development Decision, according to **Paragraph 1.4** and **Paragraph 4.4**.

2.16.3.1. **(Added-AFMC)** For programs where a Materiel Development Decision is not accomplished, the Integrated Test Team will be formed and chartered as soon as possible during the requirements development phase of the program or the initiation of an AF Form 1067. **(T-2)**.

2.16.4. Ensure Chief Developmental Tester or Test Manager leads development of the Integrated Test Team charter and coordinate with stakeholder organizations.

2.16.5. Ensure a Lead Developmental Test and Evaluation Organization is selected and designated as early as possible (i.e., at or before Milestone A) according to **Paragraph 4.4** and **Paragraph 4.5** Determine the scope of Developmental Test and Evaluation needed throughout the project or program life cycle in accordance with **Chapter 4** and **Chapter 5**.

2.16.5.1. **(Added-AFMC)** Maintain a copy of all approved LDTO designations (AFMC Form 42). **(T-2)**.

2.16.5.2. **(Added-AFMC)** Ensure the necessary contractor test support and the government's test and evaluation oversight authorities are established early in the contracting process, including those required by the Chief Developmental Tester/Test Manager and LDTO. **(T-2)**.

2.16.6. Ensure timely government access to contractor and other test and evaluation data, deficiency reporting processes, and all program test and evaluation results through a common test and evaluation database (described in **Paragraph 5.18.1**) available to program stakeholders with a need to know as determined by the Integrated Test Team. Official government Deficiency Reports, however, must be input into the Joint Deficiency Reporting System.

2.16.7. Direct the development of a strategy for test and evaluation, Test and Evaluation Master Plan, and developmental/integrated test plans in support of the program requirements, acquisition, cyber test strategies and the Program Protection Plans.

2.16.8. Document and track all test and evaluation related risks throughout the life cycle of the system.

2.16.9. Regarding Live Fire Test and Evaluation, the Program Manager or designated representative will:

2.16.9.1. Ensure systems are screened and correctly designated as "covered systems," "major munitions programs," or "covered product improvement programs" if required. See

AFI 63-101_20-101 for further guidance. Coordinate the proposed nominations with AF/TEP and the Program Executive Officer before obtaining SAF/AQ approval. Forward approved nominations to DOT&E.

2.16.9.2. Plan, program, and budget for Live Fire Test and Evaluation resources if the system is a "covered system" or "major munitions program" to include test articles, facilities, manpower, instrumented threats, and realistic targets.

2.16.9.3. Identify critical Live Fire Test and Evaluation issues. Prepare and coordinate required Live Fire Test and Evaluation documentation to include the Test and Evaluation Master Plan and Live Fire Test and Evaluation strategy, plans, and reports. Review briefings pertaining to the System Under Test before forwarding to AF/TEP Workflow.

2.16.9.4. Prepare Live Fire Test and Evaluation waiver requests and legislative relief requests, if required, to include an alternative plan for evaluating system vulnerability or lethality.

2.16.10. Ensure plans for models and simulations created for test and evaluation purposes are developed, documented and maintained in the Modeling and Simulation Support Plan in accordance with AFI 63-101_20-101 and AFI 16-1005, *Modeling and Simulation Management*.

2.16.11. As early as practical, direct the development of a cyber test strategy for pre-Milestone A through acquisition in accordance with AFI 63-101_20-101. The cyber test strategy will support requirements for authorization in accordance with AFI 17-101, and AFI 63-101_20-101. Define the cyber strategy for the weapons system; sufficient elements must be incorporated into the system design to ensure both cybersecurity and cyber resiliency. A successful cyber test strategy should include but is not limited to the following:

2.16.11.1. Ensure traceability of cybersecurity and cyber resiliency requirements/objectives to test measures and objectives throughout the system's life cycle.

2.16.11.2. Identify test areas that overlap Risk Management Framework Process to assess cybersecurity and cyber resilience for Platform Information Technology systems.

2.16.11.3. Documentation sufficient to support a system-of-systems approach to testing. Documentation should provide information on the network/cyber architecture (major systems and subsystems, interconnections between subsystems, access points, and external connections), system boundaries, intended operational environment, and the anticipated cyber threat.

2.16.11.4. Support for a cyber test strategy that includes a systematic mapping of mission dependence on cyber, using relevant data from all available sources, including contractor-developed vulnerability identification reports, information security assessments, inspections, component-and subsystem-level tests, system-of-system tests, and testing in an operational environment.

2.16.11.5. Ensure the cyber test strategy covers the information required in the System Survivability Key Performance Parameters as defined in the System Survivability Key Performance Parameters/Cyber Survivability Endorsement Implementation Guide, Volume II - Risk-Managed Performance Measures for System Survivability, including addressing the ten cyber survivability attributes.

2.16.11.6. Work with Integrated Test Team to determine and document security classification of cyber test data.

2.16.12. Ensure all Developmental Test and Evaluation (both contractor and government) is conducted according to government-approved test plans and other program documentation. Ensure the Test and Evaluation Master Plan, Acquisition Strategy, System Engineering Plans, Information Support Plan, Program Protection Plan, and Life Cycle Sustainment Plan are synchronized and mutually supporting.

2.16.12.1. **(Added-AFMC)** Ensure T&E inputs and products, as well as government tester involvement/witness at the contractor facility, are included in the scope of the contract. **(T-2)**.

2.16.13. Assist assigned test organizations in determining and obtaining developmental test resources and schedule for testing.

2.16.14. Ensure Operational Test and Evaluation is conducted for all acquisition or sustainment programs requiring a Full Rate Production or fielding/deployment decision (full or partial capability) according to **Paragraph 3.5**.

2.16.15. Plan for test and evaluation of Integrated Product Support Elements throughout the system life cycle in accordance with AFI 63-101_20-101.

2.16.16. Ensure formation of Test Integrated Product Teams, such as the Material Improvement Program Review Board and the Joint Reliability and Maintainability Evaluation Team, to track and resolve deficiencies. See **Paragraph 5.19**

2.16.17. Ensure all stores are certified in accordance with AFI 63-101_20-101. If assistance is needed, contact the Air Force SEEK EAGLE Office. Hazards of Electromagnetic Radiation to Ordnance criteria must be considered in accordance with AFMAN 91-201, *Explosives Safety Standards*.

2.16.17.1. **(Added-AFMC)** Coordinate/support AFSEO aircraft store requirements such as compatibility data, knowledge, and Modeling and Simulation tools to the Air Force SEEK EAGLE Office (AFSEO).

2.16.18. Resource and support development of the test strategy in accordance with AFMAN 65-605V1, *Budget Guidance and Procedures*.

2.16.19. Track, evaluate, and take appropriate actions on Deficiency Reports in accordance with TO 00-35D-54, AFI 63-101_20-101, and AFI 63-145, *Manufacturing and Quality Management*. Continue supporting Deficiency Report evaluation and resolution during operational testing and system sustainment.

2.16.20. Implement an effective system certification process for operational testing as early as practical. Inform the Operational Test and Evaluation Certifying Official that the system is ready for dedicated operational testing according to **Paragraph 6.5** and AFMAN 63-119.

2.16.21. Secure specialized test and evaluation capabilities, resources, and instrumentation, based on Integrated Test Team recommendations, to support test and evaluation throughout the system life cycle. See DD(DTE&P)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts*, on how to secure contractor support in requests for proposals, statements of objectives, and statements of work.

2.16.22. Prioritize early tester involvement for Pre-Milestone A, rapid prototyping and rapid fielding activities. See **Paragraph 4.3** and **Paragraph 3.9.1**.

2.16.23. Provide a Safety Release to the Lead Developmental Test and Evaluation Organization and/or Operational Test Organization prior to any testing involving Air Force personnel.

2.16.24. Obtain Technical Airworthiness Authority-issued airworthiness approvals prior to flight in accordance with AFI 62-601, *USAF Airworthiness.* Provide airworthiness hazards, risks, and operating limitations to the Lead Developmental Test and Evaluation Organization and/or Operational Test Organization prior to any testing.

2.16.25. **(Added-AFMC)** Ensure test organizations (LDTO and OTO) are included in all Risk and Opportunity Management Reviews.

2.16.26. **(Added-AFMC)** Ensure test assets are disposed of IAW **paragraph 6.13**.

2.16.27. **(Added-AFMC)** Obtain appropriate spectrum certification for Radio Frequency Dependent System Testing prior to test execution. **(T-2)**.

2.17. Chief Developmental Tester, Test Manager. All Major Defense Acquisition Programs and Major Automated Information System programs are required to have a Chief Developmental Tester. This person must be appropriately qualified in accordance with AFI 63-101_20-101, AFI 36-1301, and USD(A&S) Key Leadership Position qualification standards. The Chief Developmental Tester reports to the Program Manager. The Chief Developmental Tester will be in a Defense Acquisition Workforce Improvement Act Test and Evaluation acquisition-coded (T-code) position designated as a Key Leadership Position in accordance with DoDI 5000.66. A Test Manager will be designated for all Acquisition Category II programs and below. Acquisition Category II and below Test Managers will be in a Defense Acquisition Workforce Improvement Act Test and Evaluation Coded position but are not required to be designated as a Key Leadership Position. A Chief Developmental Tester or Test Manager will be assigned to all non-Major Defense Acquisition Program, non-Major Automated Information System, Section 804 programs. The Chief Developmental Tester or Test Manager will perform the following:

2.17.1. Coordinate the planning, management, and oversight of all Developmental Test and Evaluation activities for the program.

2.17.2. Maintain oversight of program contractor test and evaluation activities and the test and evaluation activities of Participating Test Organizations supporting the program.

2.17.3. Work with the Lead Developmental Test and Evaluation Organization to determine when contractors require Lead Developmental Test and Evaluation Organization oversight.

2.17.4. Advise the Program Manager on test issues and responsibilities listed in **Paragraph 2.16** and help the Program Manager make technically informed, objective judgments about government and contractor Developmental Test and Evaluation results.

2.17.5. Provide program guidance to the Lead Developmental Test and Evaluation Organization and the Integrated Test Team.

2.17.6. Inform the Program Manager if the program is placed on the OSD Test and Evaluation Oversight for Developmental Test and Evaluation, Operational Test and Evaluation, or Live Fire Test and Evaluation.

2.17.7. Participate with Lead Developmental Test and Evaluation Organization in the Preliminary Design Review, Critical Design Review, Operational Test Readiness Review, and Test Readiness Review. The Chief Developmental Tester and/or Test Manager chairs the government Developmental Test and Evaluation Test Readiness Review.

2.17.8. Chair the Integrated Test Team with the Operational Test Organization.

2.17.9. Coordinate the development of the strategy for test and evaluation, Test and Evaluation Master Plan, cyber test strategy, and other test and evaluation documentation in accordance with the DoD 5000-series, AFI 63-101_20-101, and this AFI.

2.17.10. Ensure the Test and Evaluation Master Plan incorporates cyber test requirements as derived from the Cybersecurity Strategy throughout all phases of program development and the test requirements for system cybersecurity and cyber resiliency are complete and testable.

2.17.11. Develop and collaborate Critical Technical Parameters with the Chief Engineer, and coordinate with the Integrated Test Team for inclusion in the Test and Evaluation Master Plan.

2.17.12. Review and approve Contractor Developmental Test Plans with the assistance of the Lead Developmental Test and Evaluation Organization and Integrated Test Team.

2.17.13. Assist the Chief Engineer when assessing the technological maturity and integration risk of critical technologies.

2.17.13.1. **(Added-AFMC)** Ensure the LDTO and OTO are active participants in program Risk and Opportunity Management Reviews.

2.17.13.2. **(Added-AFMC)** Coordinate with the LDTO on developmental test results associated with managed program Risk and Opportunity Management.

2.17.14. Coordinate with the program Chief Engineer and test organizations to identify required technical and safety reviews.

2.18. Lead Developmental Test and Evaluation Organization. The Lead Developmental Test and Evaluation Organization functions as the lead integrator for a program's developmental test and evaluation activities. The Lead Developmental Test and Evaluation Organization (or alternate Lead Developmental Test and Evaluation Organization described in **Paragraph 4.5.3**) is separate from the program office, but supports the Program Manager and Integrated Test Team through the Chief Developmental Tester and/or Test Manager in a provider-customer relationship with regard to the scope, type, and conduct of required developmental test and evaluation.

2.18. (AFMC) Lead Developmental Test and Evaluation Organization. All references to the LDTO apply to the Alternate LDTO.

2.18.1. The Lead Developmental Test and Evaluation Organization may designate a sub organization, such as an Executing Test Organization or Participating Test Organization, to conduct the test with Lead Developmental Test and Evaluation Organization oversight. Exception: Due to limited qualified space Lead Developmental Test and Evaluation Organizations, a different Lead Developmental Test and Evaluation Organization construct is authorized for space systems. The Program Executive Officer may use an internal Lead Developmental Test and Evaluation Organization, provided it does not report to the Program Manager of Record, with the approval of AFSPC/TE.

2.18.2. The Lead Developmental Test and Evaluation Organization will:

2.18.2.1. Provide technical expertise on Developmental Test and Evaluation matters to the program's Chief Developmental Tester or Test Manager.

2.18.2.1. **(AFMC)** Actively participate in Program Risk and Opportunity Management Reviews.

2.18.2.2. Assist the Chief Developmental Tester and/or Test Manager and the requirements, acquisition, and cyber test communities in developing studies, analyses, and program documentation in accordance with AF/A5R Requirements Development Guidebooks, AFI 63-101_20-101, and AFI 17-101.

2.18.2.2. **(AFMC)** Coordinate with the CDT, OTO, and contractor test leads to build, review and/or update all test strategies (Live Fire, Cyber…) in the TEMP to reflect a combined and integrated test approach.

2.18.2.3. Participate in Integrated Test Teams as they are being formed and assist Test Integrated Product Teams as required.

2.18.2.4. Conduct Developmental Test and Evaluation activities as directed by the program's Chief Developmental Tester and/or Test Manager.

2.18.2.5. Plan, manage, and/or conduct government Developmental Test and Evaluation (to include Live Fire Test and Evaluation, and integrated testing) according to the strategy for test and evaluation, the Test and Evaluation Master Plan, and Developmental Test and Evaluation and Live Fire Test and Evaluation strategies and plans.

2.18.2.5. **(AFMC)** Participate in Configuration Control Boards, product improvement working groups, test management councils and assist TTP development as required.

2.18.2.5.1. **(Added-AFMC)** Identify and schedule long-lead and/or limited availability facilities (Climatic Lab, Anechoic Chamber, etc.) primary and backup.

2.18.2.6. Collaborate with the Chief Developmental Tester and/or Test Manager to establish, coordinate, and oversee a confederation of government Developmental Test and Evaluation organizations that plan and conduct Developmental Test and Evaluation according to the Test and Evaluation Master Plan.

2.18.2.7. Oversee contractor Developmental Test and Evaluation as directed by the Chief Developmental Tester and/or Test Manager.

2.18.2.7.1. **(Added-AFMC)** LDTOs are responsible for the contractor or Participating Test Organization (including non-AF) test execution in support of their test program and will ensure safe execution of approved test plans IAW independent safety and technical reviews and maintain Test Execution Authority. **(T-2)**.

2.18.2.7.2. **(Added-AFMC)** The LDTO maintains the authority to halt tests when additional risks are assessed. **(T-2)**.

2.18.2.8. Assist the Chief Developmental Tester and/or Test Manager in reaching technically informed and objective judgments about contractor Developmental Test and Evaluation results.

2.18.2.9. Conduct or oversee cyber tests in support of the cyber test strategy as directed by the Chief Developmental Tester and/or Test Manager.

2.18.2.10. Accomplish independent Technical and Safety Reviews. All test organizations must establish procedures for when and how these reviews are accomplished.

2.18.2.11. Participate in the certification of readiness for dedicated operational testing in accordance with AFMAN 63-119.

2.18.2.12. Provide reports and assessments with objective, accurate and defensible information to make informed acquisition decisions.

2.18.2.13. Report, validate, and initially prioritize Deficiency Reports in accordance with TO 00-35D-54.

2.18.2.14. Provide government Developmental Test and Evaluation results and final reports to the Program Manager, the Program Executive Officer, and other stakeholders in support of decision reviews and certification of readiness for dedicated operational testing. Provide results and reports to the program's common test and evaluation database (see **Paragraph 5.18**).

2.18.2.15. Collaborate with AF/TE to develop Developmental Test and Evaluation Sufficiency Assessments for Major Defense Acquisition Programs for which the Service Acquisition Executive is the Milestone Decision Authority in accordance with DTM 19-007. (see **Paragraph 5.23**)

2.18.2.16. Participate, if tasked, on Independent Technical Risk Assessment teams. AF Independent Technical Risk Assessment teams will assess technology and manufacturing processes for Major Defense Acquisition Programs and must be completed before Milestone A or Milestone B decisions (see AFI 63-101_20-101 for more info).

2.18.2.17. **(Added-AFMC)** Ensure T-2 modifications on aerospace vehicles are approved IAW AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles* and oversee flight testing until the safety of the modification has been verified. **(T-2)**.

2.19. Participating Test Organizations. Participating Test Organizations will:

2.19.1. Participate in Integrated Test Teams and Test Integrated Product Teams as requested by the Chief Developmental Tester and/or Test Manager, Lead Developmental Test and Evaluation Organization, Executing Test Organization, Operational Test Organization, and other Integrated Test Team members. **(T-1).**

2.19.2. Assist other test organizations as described in Test and Evaluation Master Plans, test plans, and other program documentation. **(T-1).**

2.19.3. Mark and handle cybersecurity vulnerabilities according to appropriate security classification.

2.20. Integrated Test Team. The Integrated Test Team will:

2.20.1. Develop and manage the strategy for test and evaluation and test plans that are integrated to effectively support the requirements, acquisition, cyber, and sustainment strategies. A single Integrated Test Team may cover multiple related programs such as systems of systems. Program Managers should not have multiple project-level Integrated Test Teams within a program, but should create focused subgroups that report to the Integrated Test Team. New programs should consider using an existing Integrated Test Team's expertise to ensure more efficient startup.

2.20.2. Develop and implement an Integrated Test Team charter according to **Paragraph 4.4**. Recommended member organizations are listed in **Paragraph 4.4.4**. Coordinate updates to the charter as program changes warrant. **Note:** During Material Solution Analysis or early Technology Maturation and Risk Reduction phase, provisional or temporary Integrated Test Team representatives may be required to initiate the processes cited in **Paragraph 4.4**

2.20.3. Recommend a Lead Developmental Test and Evaluation Organization to the Program Manager for concurrence, through the Program Executive Officer for concurrence prior to AFMC/A3 or AFSPC/TE approval according to **Paragraph 4.5**

2.20.4. Direct formation of subgroups (e.g., integrated product teams) as needed to address test and evaluation data analysis, problem solving, test planning, and to coordinate test, execution, and reporting.

2.20.5. Assist in establishing test teams to conduct integrated testing, to include integrated warfighting and cross-domain test and evaluation.

2.20.6. Develop the strategy for test and evaluation, Test and Evaluation Master Plan, Life Cycle Sustainment Plans, and other test and evaluation documentation in accordance with the DoD 5000-series, AFI 63-101_20-101, and this AFI.

2.20.7. Assist the requirements community in developing applicable requirements documents, enabling and operating concepts, and architectures as described in CJCSI 5123.01H, the AF/A5R Requirements Development Guidebooks, and AFI 17-140. For defense business systems programs, also reference AFMAN 63-144, *Business Capability Requirements, Compliance, and System Acquisition.*

2.20.8. Develop cyber test strategy in accordance with AFI 63-101_20-101, AFI 17-101, and this AFI. For information systems containing Special Access Program information, refer to *DoD Joint Special Access Program Implementation Guide*. Ensure cyber test strategy includes information required to support the System Survivability Key Performance Parameters including addressing the ten cyber survivability attributes.

2.20.9. Ensure interoperability testing is planned in accordance with DoDI 8330.01 and CJCSI 5123.01H.

2.20.10. Review program's Information Support Plan via the formal Information Support Plan staffing process, to ensure test and evaluation data is consistent with the Test and Evaluation Master Plan and other applicable test and evaluation documentation.

2.20.11. Plan for a common test and evaluation database for the program according to **Paragraph 5.18**.

2.20.12. Assist the acquisition community in developing studies, analyses, documentation, strategies, contractual documents, and plans.

2.20.13. Ensure test teams report, validate, and prioritize Deficiency Reports in accordance with TO 00-35D-54, AFI 63-145, AFI 17-101 and AFI 63-101_20-101. See **Paragraph 5.19** and **Paragraph 5.20**

2.20.14. Review and provide inputs to contractual documents to ensure they address government testing needs according to **Paragraph 5.3**. Additional information can be found

in DD(DTE&P)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts*.

2.20.14.1. **(Added-AFMC)** Determine testing requirements for inclusion in the Request for Proposal(s) including Statements of Objectives/Work (SOO/SOW), Contract Data Requirements List (CDRL) and Data Item Descriptions (DIDs) as required. **(T-2)**

2.20.15. Monitor contractor Developmental Test and Evaluation and the activities of all test and evaluation team members.

2.20.16. Identify test and evaluation resource requirements, including acquisition of test items, necessary facility upgrades, and personnel.

2.20.17. Ensure that all test and evaluation activities comply with AFPD 16-6, *International Arms Control and Nonproliferation Agreements and the DoD Foreign Clearance Program*. If required, coordinate with SAF/GCI and AF/A3S.

2.20.18. Outline which test and evaluation-related records will be retained and/or forwarded to the Defense Technical Information Center and other repositories according to **Paragraph 5.18.2**, AFMAN 33-363, and Air Force Records Information Management System.

2.20.19. Develop a distribution list for all Developmental Test and Evaluation reports which includes operational testers, Participating Test Organizations, the Program Executive Officer, applicable MAJCOMs, Center Test Functional Leaders, AF/TE, and the Defense Technical Information Center.

2.21. (Added-AFMC) Air Force Test Center (AFTC). AFTC is the Air Force's primary "Lead Developmental Test Organization" and will be involved in test activities throughout a program's life cycle. Examples of test activities include High Performance Team meetings, early program pre-Integrated Test Team activities, etc. See AFMC MD4-404.

2.22. (Added-AFMC) Other AFMC Centers. To manage test activities, Center commanders will:

2.22.1. **(Added-AFMC)** Establish a Center Test Authority or establish an agreement with another Center's Test Authority to execute the roles and responsibilities of **paragraph 2.23**. **(T-2)**.

2.22.2. **(Added-AFMC)** Appoint a Center Test Functional Leader (or Center Senior Cross-Functional Leader for Test and Evaluation IAW AFMCI 36-2645) to lead the Center Test Authority. This individual must meet APDP T&E Level 3 Key Leadership Position qualification standards. **(T-2)**. (Note: IAW AFMCI 36-2645 T&E must implement cross-functional management including Center Senior Functional roles and responsibilities).

2.23. (Added-AFMC) Center Test Authority. The Center Test Authority is an organization responsible for overseeing/managing Test and Evaluation functional processes and policy across their respective Center, and maintaining insight into their Center's portfolio of T&E programs. Center Test Authorities will:

2.23.1. **(Added-AFMC)** Develop and document a cross-functional process to manage the Center's Test & Evaluation personnel, activities and interests for Center leadership. Coordinate with MAJCOM and Center functionals to create flexibility between multiple functional job series and develop a qualified Test & Evaluation workforce, to include

mentoring and producing qualified Chief Developmental Testers and Test Managers. Develop and validate metrics that describe how well the Center is performing its test role as well as the overall health of the Test & Evaluation enterprise.**(T-2)**.

2.23.1.1. **(Added-AFMC)** A minimum of APDP T&E certification will be in accordance with AFI 63-101/20-101 for personnel performing test activities in the Center Test Authority office.

2.23.1.2. **(Added-AFMC)** Assist unit manpower personnel flights to ensure Chief Developmental Tester/Test Manager and T&E personnel positions are correctly coded and resourced with qualified persons who possess the requisite T&E experience and Acquisition Professional Development Program certifications and meet the KLP requirements for the CDT positions. **(T-2)**.

2.23.2. **(Added-AFMC)** Provide career mentoring to assigned T&E (T-coded) personnel to include developing education plans.

2.23.3. **(Added-AFMC)** Support Chief Developmental Testers/Test Managers in establishing Integrated Test Teams, developing Integrated Test Team charters, and reviewing program Test and Evaluation Master Plans, Life Cycle Sustainment Plans, Systems Engineering Plans, and other T&E planning documentation. **(T-2)**.

2.23.4. **(Added-AFMC)** Assist Center leadership and program offices in developing and implementing guidance and processes for sufficient and independent technical and safety reviews. **(T-2)**.

2.23.4.1. **(Added-AFMC)** Participate in Technical Review Board, Safety Review Board, and Test Readiness Reviews as required. **(T-2)**.

2.23.4.2. **(Added-AFMC)** Provide independent technical and test safety risk reviews for all testing without a LDTO from the pre-approved AFMC LDTO list. **(T-2)**.

2.23.5. **(Added-AFMC)** Manage Center's LDTO processes and coordinate on all LDTO recommendations. **(T-2)**.

2.23.5.1. **(Added-AFMC)** Inform the program office and HQ AFMC/A3/6 when a LDTO is no longer suitable.

2.23.6. **(Added-AFMC)** Review each Foreign Military Sales Letter of Offer and Acceptance and recommend T&E strategy and required funding. Support the test manager in developing initial test strategy and associated cost with AFTC's assistance (as required). **(T-2)**.

2.23.7. **(Added-AFMC)** Provide Center-level oversight of T&E resource management procedures (use, re-use, and disposal), test capability development activities, and T&E support agreements. **(T-2)**.

2.23.8. **(Added-AFMC)** Maintain, and manage requisite processes and capabilities to conduct assigned LDTO duties IAW **Attachment 3**. **(T-2)**.

2.23.9. **(Added-AFMC)** Provide T&E management expertise, advice, reach-back, and informal T&E training to programs for Acquisition Strategy Panels, program reviews, contracts, etc. **(T-2)**

2.23.10. **(Added-AFMC)** Shall define and document the T&E Workforce Core Competencies may include knowledge of:

2.23.10.1. **(Added-AFMC)** Development of strategy, schedule, resourcing, and documentation for T&E.

2.23.10.2. **(Added-AFMC)** T&E regulations, standards, and techniques for management of all phases of developmental testing including Modeling and Simulation, component-level, system-level, and cyber testing.

2.23.10.3. **(Added-AFMC)** Technical, Safety, and Test Readiness Reviews.

Chapter 3

TYPES OF TEST AND EVALUATION

3.1. Major Categories of Test and Evaluation. Air Force testing falls into two overarching categories, developmental testing and operational testing. If a specific test and evaluation requirement does not fall precisely into one of the following discrete categories of testing, consult with AF/TEP to select and tailor the type of testing that best fits the need.

3.2. Developmental Test and Evaluation. Developmental testing is conducted throughout the acquisition and sustainment processes to assist engineering design and development, and verify that Critical Technical Parameters have been achieved. Developmental Test and Evaluation supports the development and demonstration of new materiel solutions or operational capabilities as early as possible in the acquisition life cycle. After Full Rate Production/Full Deployment or fielding, Developmental Test and Evaluation supports the sustainment and modernization of systems. To support integrated testing, as many test activities as practical are conducted in operationally-relevant environments without compromising engineering integrity, safety, or security. Developmental testing leads to and supports a certification that the system is ready for dedicated operational testing in accordance AFMAN 63-119. In addition, developmental testing:

3.2.1. Assesses the technological capabilities of systems or concepts in support of requirements activities described in the AF/A5R Requirements Development Guidebooks (e.g., courses of action). Conducts research, development, test, and evaluation to investigate new concepts and technologies and collect basic scientific and engineering data.

3.2.2. Provides empirical data for cost, schedule, and performance trade-offs.

3.2.3. Uses modeling and simulation tools and digital system models; evaluates modeling and simulation tools for applicability; and performs verification and validation with actual test data to support accreditation of modeling and simulation tools.

3.2.4. Identifies and helps resolve deficiencies and vulnerabilities as early as possible.

3.2.5. Verifies the extent to which design risks have been minimized.

3.2.6. Verifies compliance with specifications, standards, and contracts.

3.2.7. Characterizes system performance and military utility.

3.2.8. Assesses quality and reliability of systems.

3.2.9. Quantifies manufacturing quality and contract technical performance.

3.2.10. Determines fielded system performance against changing operational requirements and threats.

3.2.11. Ensures all new developments, modifications, upgrades, sustainment equipment, support equipment, commodity replacement studies and demonstrations address operational safety, security, cybersecurity, cyber resiliency, environment, occupational health integration, and human systems integration in accordance with AFI 63-101_20-101 and AFMCI 63-1201, *Implementing Operational Safety Suitability and Effectiveness (OSS&E) and Life Cycle Systems Engineering (LCSE)*.

3.2.12. Supports surveillance programs, value engineering projects, productivity, reliability, availability and maintainability projects, technology insertions, Defense Business Systems, and other modifications in accordance with AFI 63-101_20-101, AFMAN 63-144, and Air Force Pamphlet (AFPAM) 63-128, *Integrated Life Cycle Management*.

3.2.13. Uses various appropriated fund types that depend on the nature and purpose of the work and the type of testing required. For specific funding guidance, see DoD 7000.14-R, *Department of Defense Financial Management Regulation (FMRs)*, Vol. 2A, and AFMAN 65-605V1.

3.2.14. Supports Position, Navigation, and Timing and Navigation Warfare Developmental Test and Evaluation in accordance with DoDI 4650.08, *Positioning, Navigation, and Timing (PNT) and Navigation Warfare (NAVWAR)*.

3.3. Types of Developmental Testing. This AFI does not attempt to prescribe an all-inclusive list of developmental test types. The potential exists for several developmental testing types to overlap. The types of Developmental Test and Evaluation must be described in the Test and Evaluation Master Plan and test plans to facilitate planning and coordination for integrated testing. The following general Developmental Test and Evaluation types exist for many acquisition programs:

3.3.1. Qualification Test and Evaluation. Qualification Test and Evaluation is a tailored type of Developmental Test and Evaluation performed by the Lead Developmental Test and Evaluation Organization primarily for commercially available -off-the-shelf items, non-developmental items, and government furnished equipment. For Defense Business Systems and information technology systems, Qualification Test and Evaluation validates the product integrates into the intended environment and meets documented functional, non-functional, cybersecurity requirements, cyber resiliency requirements and performance standards. Qualification Test and Evaluation includes the following test segments: System Integration Test, Data Management Evaluation, System Operability Evaluation, Performance Evaluation Test, Cybersecurity Evaluation, Regression Test, and User Acceptance Test. Depending on user requirements, these and other items may require little or no government funded research and development, engineering, design, or integration efforts. Chief Developmental Testers plan for and conduct test and evaluation of commercially available off-the-shelf items, non-developmental items, and government-furnished equipment, even when these items come from pre-established sources. See **Paragraph 5.12** for more information on commercially available off-the-shelf items, non-developmental items, and government-furnished equipment. **Note**: Qualification Test and Evaluation generally uses procurement (e.g., 3010 [aircraft], 3020 [missiles], or 3080 [other]), or operations and maintenance funds (i.e., 3400) in accordance with DoD 7000.14-R, Vol. 2A, and AFMAN 65-605V1.

3.3.2. Production-Related Testing. The Program Manager, through the Chief Developmental Tester, ensures test and evaluation is conducted on production items to demonstrate that specifications and performance-based requirements of the procuring contracts have been fulfilled. Defense Contract Management Agency personnel normally oversee this testing at the contractor's facility. Typical tests (defined in **Attachment 1**) include: first article tests; lot acceptance tests; pre-production qualification tests; production qualification tests; and production acceptance test and evaluation. Developmental and operational testers may observe, collect data, or participate during these tests as needed.

3.3.3. Live Fire Test and Evaluation. Live Fire Test and Evaluation is a type of Developmental Test and Evaluation that provides timely, rigorous, and credible vulnerability or lethality test and evaluation of "covered" systems as they progress through the Engineering and Manufacturing Development Phase and early Production and Deployment Phase prior to Full Rate Production and Full Deployment, or a major system modification that affects survivability. Survivability information from Live Fire Test and Evaluation consists of susceptibility, vulnerability, and recoverability information derived from the firing of actual weapons (or surrogates if actual threat weapons are not available) at components, sub-systems, sub-assemblies, and/or full up, system-level targets. Modeling, simulation, and analysis must be an integral part of the Live Fire Test and Evaluation process. The Air Force must initiate Live Fire Test and Evaluation programs sufficiently early to allow test results to impact system design prior to Full Rate Production and Full Deployment or major modification decisions. See **Paragraph 5.8** for more information; **Attachment 1** for key definitions; and AFI 63-101_20-101. The Air Force accomplishes Live Fire Test and Evaluation to:

3.3.3.1. Provide information to decision makers on potential user casualties, system vulnerabilities, lethality, attack avoidance capability, and system recoverability while taking into equal consideration the susceptibility to attack and combat performance of the system.

3.3.3.2. Ensure system fielding decisions include an evaluation of vulnerability and lethality data under conditions that are as realistic as possible.

3.3.3.3. Assess battle damage repair capabilities and issues. While assessment of battle damage repair is not a statutory requirement of Live Fire Test and Evaluation, test officials should exploit opportunities to assess such capabilities whenever prudent and affordable.

3.4. Operational Test. Operational test determines the operational effectiveness and suitability of the systems under test. It determines if operational capability requirements have been satisfied and assesses system impacts to both peacetime and combat operations. It identifies and helps resolve deficiencies as early as possible, identifies enhancements, and evaluates changes in system configurations that alter system performance. Operational test includes a determination of the operational impacts of fielding and/or employing a system across the full spectrum of military operations and may be conducted throughout the system life cycle. Operational test may also evaluate or assess doctrine, organization, training, materiel, leadership and education, personnel and facilities and the policy that affects the other seven elements.

3.5. Types of Operational Test and Evaluation. Operational Test and Evaluation is the formal field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of that system for use in combat by typical military users, and the evaluation of the results of such test. The types of operational testing listed below offer operational testers a range of options for completing their mission. "Evaluations" collect, analyze, and report data against stated criteria with a high degree of analytical rigor and are used to inform Full Rate Production and Full Deployment decisions. "Assessments" usually collect and analyze data with less analytical rigor, need not report against stated criteria, and cannot be the sole source of test and evaluation data for Full Rate Production and Full Deployment decisions. All programs that result in a Full Rate Production and Full Deployment decision require an appropriate type of operational testing supported by sufficient independent evaluation to inform that decision. The Integrated Test Team

recommends an appropriate level of operational test and evaluation to the Milestone Decision Authority and test and evaluation oversight organizations (if applicable) for approval. Operational testing of commercially available off-the-shelf items, non-developmental items, and government-furnished equipment cannot be omitted simply because these items came from pre-established sources (see **Paragraph 5.12**). Acquisitions that support sustainment, to include acquisition of support equipment and form, fit, function, and interface replacements, require Full Rate Production and Full Deployment decisions and an appropriate type of operational testing. Operational testing must be based on approved operational requirements documents specifically for the capabilities being fielded; however, the Operational Test Organization has the authority to test against expanded operational requirements based on real-world developments. See the definition of Operational Test and Evaluation in **Attachment 1** for further information.

3.5.1. Initial Operational Test and Evaluation. Initial Operational Test and Evaluation is the primary dedicated Operational Test and Evaluation of a system before Full Rate Production and Full Deployment. Initial Operational Test and Evaluation determines if operational requirements and critical operational issues have been satisfied and assesses system impacts to peacetime and combat operations. Tests are conducted under operational conditions, including combat mission scenarios that are as operationally realistic as possible. A dedicated phase of Initial Operational Test and Evaluation is required for new Acquisition Category I and II programs and DOT&E oversight programs. An Initial Operational Test and Evaluation is not applicable to Acquisition Category III programs, except for those on an Oversight program; instead, a MAJCOM-conducted Operational Utility Evaluation or Force Development Evaluation is used. Initial Operational Test and Evaluation shall only be conducted by AFOTEC. AFOTEC determines the operational effectiveness and operational suitability of the items under test using production or production-representative articles with stabilized performance and operationally representative personnel. The determination of appropriate Operational Test Organization for subsequent modifications and upgrades, as well as applicability to other types of programs, will be accomplished according to **Paragraph 4.6** and **Figure 4.3**.

3.5.2. Qualification Operational Test and Evaluation. Qualification Operational Test and Evaluation is a tailored type of Initial Operational Test and Evaluation performed on systems for which there is little to no Research, Development, Test and Evaluation-funded development effort. Conducted only by AFOTEC, Qualification Operational Test and Evaluation is used to evaluate military-unique portions and applications of commercially available off-the-shelf items, non-developmental items, and government-furnished equipment for military use in an operational environment. Qualification Operational Test and Evaluation supports the same kinds of decisions as Initial Operational Test and Evaluation. See **Paragraph 5.12** for more information on commercially available off-the-shelf items, non-developmental items, and government-furnished equipment.

3.5.3. Follow-on Operational Test and Evaluation. Follow-on Operational Test and Evaluation is the continuation of Operational Test and Evaluation after Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, or Multi-service Operational Test and Evaluation, and is conducted only by AFOTEC. It answers specific questions about unresolved Critical Operational Issues and test issues; verifies the resolution of deficiencies or shortfalls determined to have substantial or severe impact(s) on mission operations; or completes test and evaluation of those areas not finished during previous Operational Test and

Evaluation. AFOTEC reports document known requirements for Follow-on Operational Test and Evaluation. More than one Follow-on Operational Test and Evaluation may be required. **Note**: Follow-on Operational Test and Evaluation that follows a Qualification Operational Test and Evaluation as described in **Paragraph 3.5.2** is generally funded with procurement (3010, 3011, 3020, or 3080) or operations and maintenance (3400) funds, not Research, Development, Test and Evaluation 3600 funds. See **Paragraph 5.2** for test and evaluation funding sources, and **Paragraph 5.22** for test deferrals, limitations, and waivers.

3.5.4. Force Development Evaluation. Force Development Evaluation is a type of dedicated Operational Test and Evaluation performed by MAJCOM Operational Test Organizations in support of MAJCOM-managed system acquisition-related decisions and milestones prior to initial fielding, or for subsequent system sustainment or upgrade activities. A Force Development Evaluation may be used for multiple purposes to include:

3.5.4.1. Evaluate and verify the resolution of previously identified deficiencies or shortfalls, including those rated in AFOTEC reports as not having a substantial or severe impact on mission operations.

3.5.4.2. Evaluate routine software modifications (e.g., operational flight programs), subsequent releases, upgrades, and other improvements or changes made to sustain or enhance the system.

3.5.4.3. Evaluate and verify correction of new performance shortfalls discovered after fielding of the system.

3.5.4.4. Evaluate operational systems against foreign equipment.

3.5.4.5. Evaluate operational systems against new or modified threats.

3.5.4.6. Evaluate military-unique portions and applications of commercially available off-the-shelf items, non-developmental items, and government-furnished equipment for military use.

3.5.5. Multi-Service Operational Test and Evaluation. Multi-service Operational Test and Evaluation is Operational Test and Evaluation (Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, or Force Development Evaluation) conducted by two or more Service Operational Test Organizations for systems acquired by more than one Service. Multi-service Operational Test and Evaluation is conducted in accordance with the test and evaluation directives of the lead Operational Test Organization, or as agreed in a memorandum of agreement between the participants. Refer to the memorandum of agreement on *Multi-Service Operational Test and Evaluation and Operational Suitability Terminology and Definitions*, April 2015 for guidance on conduct, execution, and reporting of a Multi-service Operational Test and Evaluation. A copy of the Multi-service Operational Test and Evaluation memorandum of agreement is available by email if a request is sent to: "**AFOTEC.A5A8.Workflow@us.af.mil**." Also, see **Paragraph 4.6.6.4, Paragraph 4.8,** and **Paragraph 7.4.4**. If MAJCOMs are involved in multi-Service testing without AFOTEC, they should use this memorandum of agreement as a guide.

3.5.6. Tactics Development and Evaluation. Tactics Development and Evaluation is a type of operational testing conducted by MAJCOMs to refine doctrine, system capabilities, and

Tactics, Techniques, and Procedures (TTP) throughout a system's life cycle in accordance with AFMAN 11-260, *Tactics Development Program*. Tactics Development and Evaluations normally identify non-materiel solutions to problems or evaluate better ways to use new or existing systems.

3.5.7. Operational Utility Evaluation. An Operational Utility Evaluation is an operational test which may be conducted by AFOTEC or MAJCOM Operational Test Organizations whenever a dedicated Operational Test and Evaluation event is required, but the full scope and rigor of formal Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, or Force Development Evaluation is not appropriate or required in accordance with this AFI. Operational Utility Evaluations may be used to support operational decisions (e.g., fielding a system with less than full capability, to include but not limited to integrated testing of releases and increments of information technology capabilities) or acquisition-related decisions (e.g., low-rate initial production) when appropriate throughout the system life cycle. An Operational Utility Evaluation cannot support Full Rate Production or Full Deployment decisions for Acquisition Category I, II, or oversight programs. Operational Test Organizations may establish their supplemental internal guidance on when and how to use Operational Utility Evaluations. Use of Operational Utility Evaluation or Force Development Evaluation to support MAJCOM-managed fielding or production decisions is at the discretion of the appropriate MAJCOM staff or test organization.

3.5.8. Operational Assessment. Operational Assessments are conducted by AFOTEC or MAJCOM Operational Test Organizations in preparation for dedicated operational testing and typically support Milestone C or low-rate initial production decisions. They are designed to be progress reports and not intended to determine the overall effectiveness or suitability of a system. They provide early operational data and feedback from actual testing to developers, users, and decision makers. Operational Assessments also provide a progress report on the system's readiness for Initial Operational Test and Evaluation or Force Development Evaluation, or support the assessment of new technologies. Operational Assessments will not be used as substitutes for Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Force Development Evaluation, or Operational Utility Evaluation. Operational Assessments may be integrated with Developmental Test and Evaluation to:

3.5.8.1. Assess and report on a system's maturity and potential to meet operational requirements during dedicated operational testing.

3.5.8.2. Support long-lead, low-rate initial production, or increments of acquisition programs.

3.5.8.3. Identify deficiencies or design problems that can impact system capability to meet concepts of employment, concepts of operation or operational requirements.

3.5.8.4. Uncover potential system changes needed which in turn may impact operational requirements, Critical Operational Issues, or the Acquisition Strategy.

3.5.8.5. Support the demonstration of prototypes, new technologies, or new applications of existing technologies, and demonstrate how well these systems meet mission needs or satisfy operational capability requirements.

3.5.8.6. Support proof of concept initiatives.

3.5.8.7. Augment or reduce the scope of dedicated operational testing.

3.5.9. Early Operational Assessment. Early Operational Assessments are similar to Operational Assessments, except they are performed prior to Milestone B to provide very early assessments of system capabilities and programmatic risks. Most Early Operational Assessments are reviews of existing documentation, but some may require hands-on involvement with prototype hardware and/or software.

3.5.10. Operational Utility Assessment. AFOTEC conducts Operational Utility Assessments to assess the military utility of a system in support of the Joint Concept Technology Demonstration Program and experimentation programs.

3.5.11. Military Utility Assessment. A Military Utility Assessment is used as a MAJCOM assessment of a new capability to determine how well it addresses a stated military need when a formal Operational Assessment or Operational Test and Evaluation is not warranted (non-oversight, not a program of record, etc.). The assessment should characterize the military utility, considering all operational factors including maintainability.

3.5.12. Sufficiency of Operational Test Review. For some programs of limited scope and complexity, system developmental testing or integrated developmental and operational test events may provide adequate test data to support MAJCOM production or fielding decisions. In these situations, the lowest appropriate level of required operational testing may consist of a review of existing data rather than a separate, dedicated operational test event. The Integrated Test Team should recommend a Sufficiency of Operational Test Review when collected test data can address all test measures and result in effectiveness and suitability ratings. A Sufficiency of Operational Test Review is not intended to be a cost or schedule-driven solution.

3.5.12.1. The Sufficiency of Operational Test Review must be approved by MAJCOM test and evaluation staff. The Sufficiency of Operational Test Review may be used as the source of operational test information for supporting fielding, acquisition milestone, or production decisions. See also **Paragraph 4.6.6.3**. The Sufficiency of Operational Test Review may not be used for milestone decisions associated with OSD Operational Test and Evaluation Oversight programs unless approved by the DOT&E.

3.5.12.2. See **Paragraph 7.4.5** for reporting Sufficiency of Operational Test Review results, and the *Air Force Test and Evaluation Guide* for a comparison with the Capabilities and Limitations report.

3.5.13. Summary of Operational Testing. The key distinctions between types of operational testing and the decisions they support are shown in **Table 3.1**. **Note:** **Table 3.1** is intended as a summary and may not cover all possible test and evaluation situations; refer to the descriptions in **Paragraph 3.5** or consult with AF/TEP for final guidance of any issues.

Table 3.1. Summary of Operational Testing Options.

Types of Operational Tests	Decisions Supported	Who Conducts	Types of Programs
Assessments			
Early Operational Assessment	Milestone B	AFOTEC or	

	Capability Development Document Validation Development Request for Proposal Release Decision Point	MAJCOM Operational Test Organization	All (Acquisition Category I-III, OSD Test and Evaluation Oversight, Non-Oversight) *Note 1*
Operational Assessment	Milestone C Low-Rate Initial Production Limited Deployment		
Operational Utility Assessment	Support assessments conducted on innovation programs	AFOTEC	Joint Concept Technology Demonstration and Experimentation Programs *Note 1*
Military Utility Assessment	New Science and Technology application	MAJCOM Operational Test Organization	Non-Oversight, non-program of record
Evaluations			
Initial Operational Test and Evaluation Qualification Operational Test and Evaluation Follow-on Operational Test and Evaluation	Full Rate Production Full Deployment	AFOTEC	Acquisition Category I, IA, II, OSD Test and Evaluation Oversight
Multi-Service Operational Test and Evaluation	Full Rate Production Full Deployment	AFOTEC or MAJCOM Operational Test Organization	All
Force Development Evaluation	Full Rate Production Full Deployment	MAJCOM Operational Test Organization	All *Note 2*
Operational Utility Evaluation	Full Rate Production Full Deployment	AFOTEC or MAJCOM Operational Test Organization	All *Note 3*
Sufficiency of Operational Test Review	Full Rate Production Full Deployment	MAJCOM Operational Test Organization	Non-Oversight *Notes 3, 4*
Tactics Development and Evaluation	Tactics, Techniques, and Procedures Documentation	MAJCOM Operational Test Organization	All
Notes:			

1. Cannot be substituted for Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Force Development Evaluation, or Operational Utility Evaluation. Activity falls outside the traditional acquisition process; however, Air Force testers may be required to support the activity by providing test and evaluation expertise in assessing the operational or military utility of new technologies.
2. Do not use when Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation are more appropriate.
3. Do not use when Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, or Force Development Evaluation are more appropriate.
4. A Sufficiency of Operational Test Review can be used on an OSD Oversight program if approved by DOT&E.

3.6. Testing of Training Devices. Training devices should be considered part of the system under test and must also undergo Developmental Test and Operational Test. To ensure crew training devices provide accurate and credible training throughout their life cycles, AFI 16-1007, *Management of Air Force Operational Training Systems*, gives direction and guidance for using the simulator certification and simulator validation processes. Specifically, simulator certification and simulator validation are assessments of training device effectiveness in accomplishing allocated tasks and provide a comparison of crew training device performance with the prime mission system. Simulator Certification and Simulator Validation support and complement the test of the training devices. In addition, Program Managers must include training system concepts and requirements in all acquisition strategies. They must ensure training systems are fielded concurrently with initial prime mission system fielding, and remain current throughout the weapon system life cycle in accordance with AFI 63-101_20-101. See definitions in **Attachment 1**.

3.7. Specialized Types of Test and Evaluation. Certain types of test and evaluation require test organizations to use specialized processes, techniques, requirements, and formats in addition to those prescribed in this AFI. These specialized types of test and evaluation must be integrated with other test and evaluation activities as early as possible. These tests often occur during Developmental Test and Evaluation and Operational Test and Evaluation and may have the characteristics of both. They are often done concurrently with other testing to conserve resources and shorten schedules, but may also be conducted as stand-alone test activities if necessary. These tests should be conducted in operationally relevant environments which include end-to-end scenarios. **Table 3.2** identifies guidance for the Program Manager to use in planning, conducting, and reporting these specialized types of test and evaluation.

Table 3.2. Specialized Types of Test and Evaluation.

Type of Testing	Description	References
Advanced Technology Demonstration (*See Note*)	Air Force Research Laboratory-funded, MAJCOM-sponsored development efforts that demonstrate the maturity and potential of advanced technologies for enhancing military operational capabilities.	AFI 61-101
Evaluated Level of Assurance	Evaluates offensive cyberspace operations capabilities against technical assurance standards. ACC appoints the Air Force test organization responsible for testing technologies meeting the definition.	DoDI O-3600.03

Electronic Warfare Integrated Reprogramming	Process intended to produce and deliver software/hardware changes to electronic equipment used to provide awareness and response capability within the electromagnetic spectrum. May require changes in Tactics, Techniques, and Procedures, equipment employment guidance, aircrew training and training devices (threat simulators and emitters). Provides guidance for test / fielding of mission data changes, Operation Flight Program changes, or minor hardware changes that comply with the guidance in AFI 63-101_20-101 concerning modifications.	AFI 10-703, *Electronic Warfare (EW) Integrated Reprogramming*
TEMPEST Assessment	Assesses against the requirement to control the compromise of classified electronic emissions.	Air Force Systems Security Information Management (AFSSI) 7700, *Emission Security*, AFSSI 7702, *Emission Security Countermeasures Reviews*
Foreign Comparative Testing (*See Note*)	FCT is an OSD-sponsored program for test and evaluation of foreign nations' systems, equipment, and technologies to determine their potential to satisfy validated United States operational requirements.	Title 10 United States Code (USC) Section 2350a(g) OSD Comparative Technology Office website: **https://cto.acqcenter.com/**
Joint Capability Technology Demonstrations (*See Note*)	Exploits maturing technologies to solve important military problems and to concurrently develop the associated Concept of Operations to permit the technologies to be fully exploited. Emphasis is on tech assessment and integration rather than development.	AFI 63-101_20-101 AFI 61-101
Joint Interoperability Test and Certification	Required certification for net-readiness prior to a system being placed into operation. Must be preceded by Air Force System Interoperability Testing, formal service-level testing to determine the degree to which AF systems which employ tactical data links conform to appropriate DoD MIL-STDs.	CJCSI 5123.01H DoDI 8330.01
Joint Test & Evaluation (*See Note*)	This program develops, tests and validates non-material solutions of fielded and soon to be fielded systems. Joint Test and Evaluation provides feedback to the acquisition community; however, it does not directly support system acquisition. AFJO is designated the Operational Test Agency to administer and execute tests within the AF Joint Test and Evaluation Program, including Joint Tests, Joint Feasibility Studies, Quick Reaction Tests, and Collaborative Joint Tests.	DoDI 5010.41 AFI 99-106
Testing of Urgent Needs *(See Note)*	Quick reaction capability for satisfying near-term urgent warfighter needs.	DoDI 5000.02
Unified Capabilities Certification	Certifies interoperability and information assurance for Unified Capabilities (defined as integration of voice, video, and/or data services delivered ubiquitously across a secure and highly available network infrastructure, independent of technology). ACC appoints the Air Force Unified Capabilities test organization responsible for testing technologies meeting the definition.	DoDI 8100.04
Note: Activity falls outside the traditional acquisition process; however, Air Force testers may be required to support the activity by providing test and evaluation expertise in assessing the military utility of new technologies.		

3.8. Weapons System Evaluation Program. The Weapons System Evaluation Program is a MAJCOM-conducted test program that provides a tailored end-to-end operational evaluation of fielded weapons systems and their support systems using realistic combat scenarios. The evaluation should characterize system performance and tactics, techniques, and procedures against changing operational requirements and threats to support the requirements development process. The Weapons System Evaluation Program also conducts investigative firings to revalidate capabilities or better understand munitions malfunctions.

3.9. Other Test Considerations

3.9.1. Test for Rapid Acquisition Activities

3.9.1.1. In this document, rapid acquisition activities include rapid prototype, rapid fielding programs, or system development efforts, including experiments authorized under Section 804 of the FY 16 NDAA Middle Tier Acquisition or following, tailored in accordance with DoDI 5000.02 or DoDI 5000.75 guidance.

3.9.1.2. The Program Manager must map out the test and evaluation strategy with test agency involvement. This test strategy should be mission-focused and aligned with the Concept of Operations. Early and frequent smaller-scale assessments should be planned to enable rapid learning, allow greater and earlier influence in system design, and lower the risk of unexpected system malfunctions near fielding or production decisions.

3.9.1.3. The proposed test and evaluation strategy and resources must be captured in a document such as a Master Test Plan (or tailored Test and Evaluation Master Plan) to ensure all parties (testers, program office, AF/TE) are aware of the way forward for test execution. Minimum requirements for this document are: Objectives, Schedule, Resources, Limitations, and Integrated Evaluation Framework. Live Fire Test and Evaluation should also be described as required. Signature and coordination should be limited to those with a valid stake in the test and evaluation plan to expedite approval. For non-oversight programs, coordination should include the Milestone Decision Authority, Program Manager, Lead Developmental Test and Evaluation Organization, and Operational Test Organization at a minimum. For programs on OSD Test and Evaluation oversight, the Master Test Plan will be coordinated in accordance with the Test and Evaluation Master Plan signature and coordination process in **Paragraph 4.11.3**, unless OSD waives their formal coordination authority. See **Paragraph 4.11.3.2**

3.9.1.4. Mission-focused test opportunities during developmental test permits early operational assessment and feedback. Integration of developmental and operational test should be maximized to efficiently utilize resources and reduce overall test duration. The Lead Developmental Test and Evaluation Organization must accomplish independent technical adequacy and safety reviews for all tests, demonstrations, and experiments. Test agencies will assess safety risks to personnel and property and mitigate them appropriately.

3.9.1.5. Test reports and memorandums should be relevant, timely, factual, and concise. Test organizations can support rapid learning cycles with “quick-look” reports and other innovative processes. Test reporting and coordination should be tailored to minimize the impact to production and fielding.

3.9.1.6. Rapid acquisition activities will include, at a minimum, the following items, documentation, agencies, and personnel:

3.9.1.6.1. Concept of Operations

3.9.1.6.2. Integrated Test Team

3.9.1.6.3. Chief Developmental Tester or Test Manager

3.9.1.6.4. Lead Developmental Test and Evaluation Organization

3.9.1.6.5. Operational Test Organization

3.9.1.6.6. Integrated Master Test Plan (Objectives, Schedule, Resources, and Evaluation Frameworks)

3.9.1.6.7. Developmental Test Plan

3.9.1.6.8. Operational Test Plan

3.9.1.6.9. Test Review that considers technical and safety reviews

3.9.1.6.10. Test Report or Test Memorandum

3.9.2. Cyber Test. Cyber test evaluates and characterizes systems and sub-systems operating in the cyberspace domain, and the access pathways of such systems. Cyberspace is defined as a domain characterized by the use of electronics and the electromagnetic spectrum to store, modify, and exchange data via networked systems and associated physical infrastructures. The primary objectives of cyber test are to evaluate a system's cybersecurity and cyber resilience to ultimately verify mission capability.

3.9.2.1. Cyber test should be integrated throughout contractor and government Developmental Test and Evaluation and Operational Test and Evaluation and executed in operationally representative cyberspace environments. Developmental Test and Evaluation and Operational Test and Evaluation plans must be developed, considering system architecture and all attack surfaces (interfacing and embedded systems, services, and data exchanges that may expose the system to potential cyber threats) through all applicable domains. Cyber test encompasses both cybersecurity and cyber resiliency testing. Refer to the *DoD Cybersecurity Test and Evaluation Guidebook* for additional guidance.

3.9.2.2. Cybersecurity test focuses on identifying system cyber vulnerabilities. It is scoped through assessing a system's cyber boundary and risk to mission assurance. Risk analysis, at a minimum, should consider the threat and threat severity, likelihood of discovery, likelihood of attack, and system impact. Cybersecurity is evaluated based on the Security Assessment Plan, Program Protection Plan, Life Cycle Sustainment Plan, Information Support Plan, and Risk Management Framework artifacts. Cybersecurity testing provides the data necessary to the Authorizing Official to render a determination of risk to DoD operations and assets, individuals, other organizations, and the Nation from the operation and use of the system.

3.9.2.3. Cyber resiliency testing evaluates a system's ability to meet operational requirements while under cyber attack. Cyber attack is defined as an attack, via cyberspace, designed to infiltrate, disrupt, disable, deceive, destroy, or maliciously control a target within cyberspace or a physical system. Cyber resiliency testing focuses on preventing, mitigating and recovering from a successful cyber attack and determining mission system and mission effectiveness. Cyber resiliency testing should include the information identified in the System Survivability Key Performance Parameters/Cyber Survivability Endorsement Implementation Guide Volume, including addressing the ten cyber survivability attributes.

3.9.2.4. The Integrated Test Team and test organizations must plan for appropriate cyber test to assess system vulnerabilities and mission impact. If the Integrated Test Team or test organization cannot comply with cyber test requirements, the Integrated Test Team or test organization must document the limitations and rationale in the Test and Evaluation Master Plan and test plans.

3.9.3. Agile Software Development Test. Agile software development is characterized by iterative development, early and continuous cross-functional/stakeholder involvement and is responsive to requirements that may change in priority throughout the system's development. Agile software development produces successive usable software releases that build upon previous releases through successive development cycles. A critical lynch-pin for successful agile software development is strong, effective configuration management/control of the various interfacing baselines. Agile software development test is highly integrated into the development and release cycle and is often conducted continuously throughout an iteration. It informs early and often, and combines with user feedback to not only inform stakeholders but also help evolve requirements that drive future software iteration cycles. Test must be adaptive while providing sufficient safeguards to manage risk and ensuring the program achieves intended capability.

3.9.3.1. Test obligation does not change for agile software development programs, but interaction does. Testers should be integral to cross-functional teams charged with producing working software iterations. This provides test and evaluation information throughout the software's development and allows flexibility to shifting stakeholder priorities. Agile software development does not reduce the critical need for operational-context/end-to-end testing. Especially for tightly-coupled, systems-of-systems networks, communication, coordination, and empirical demonstration and verification are essential to avoid the inadvertent introduction of mission-impeding discrepancies. Agile software development test responsibility hinges on an appropriate level of independence, effective test execution and adequacy of reporting. Working closely with the Program Management Office, the test team must at a minimum determine the following:

3.9.3.1.1. Traceability of requirements

3.9.3.1.2. Critical areas to test

3.9.3.1.3. Adequacy and Coverage of Planned Testing

3.9.3.1.4. Developmental Test and Operational Test weight of effort

3.9.3.1.5. Developmental Test and Operational Test integration

3.9.3.1.6. Level of contractor testing

3.9.3.1.7. Test frequency

3.9.3.1.8. Test reporting methods/adequacy

3.9.3.1.9. Establishment of a software release annex covering the time, place and resources of a planned release

3.9.3.1.10. Acceptance criteria

3.9.3.2. Tailored test documentation must keep up with the program's chosen agile software development method while still capturing valid program health snapshots for stakeholders. While planning the test approach, testers should establish the type and pace the frequency of reports to match software development/release cycles. Minimum documentation should capture relevant data quickly to enable subsequent software iterations:

3.9.3.2.1. Concept of Operations should be established at program initiation and be promulgated to the program office, developer, and testers to design a relevant test strategy.

3.9.3.2.2. An agile software development Test and Evaluation Master Plan or equivalent should, at a minimum, focus on four major areas: overall tailored test strategy, resources, schedule, and limitations.

3.9.3.2.3. The Operational Test Plan or Master Test Plan is a vehicle to incrementally release test plans. The tailored Operational Test Plan provides the overarching approach derived from the Test and Evaluation Master Plan and provides the framework for keeping test at pace with the agile software development velocity.

3.9.3.2.4. Reporting should be tailored to provide an accurate and relevant program assessment while avoiding undue delays to the agile software development process. Reporting methods should be established at, or even before, development commences to posture the Program Management Office for timely testing and feedback. An abbreviated test report or "quick-look" type report will accompany each integrated test during software iteration release cycles.

3.9.4. Test for Foreign Military Sales.

3.9.4.1. In accordance with Defense Security Cooperation Agency 5105.38-M, *Security Assistance Management Manual,* and AFI 63-101_20-101, testing associated with Foreign Military Sales acquisition shall meet the intent of DoD regulations and other applicable United States Government procedures for conducting test and evaluation activities, affording the foreign purchaser the same benefits and protection that apply to all DoD procurement efforts. Per AFI 63-101_20-101, the government-to-government agreement should specify any tailored Foreign Military Sales implementation.

3.9.4.2. Upon receipt of a Letter of Request from a Foreign Partner, Air Force Life Cycle Management Center (AFLCMC) or SMC Center Test Functional Leaders will develop and/or oversee, in consultation with a Lead Developmental Test and Evaluation Organization, the early case test and evaluation planning for DoD and non-DoD systems, system configurations, or system integrations in support of Foreign Military Sales programs. This strategy should, at a minimum, consider any necessary developmental test (flight test, modeling and simulation), test range(s), infrastructure, test manpower, resources, and certifications needed for appropriate testing of the system to be delivered. This preliminary test strategy should have sufficient technical fidelity to produce a rough order of magnitude estimated cost and period of performance to support a dedicated "Test" line on the Letter of Offer and Acceptance, if warranted. The Letter of Offer and Acceptance is the government-to-government agreement that identifies the defense articles and services the United States Government proposes to sell to the Foreign Partner.

3.9.4.3. The purpose of AFLCMC's or SMC's Test Functional leaders' oversight of the early test and evaluation plan is to help ensure system performance meets customer expectations of military utility per written agreement. A detailed test plan will be required once the case is established to refine the actual test requirement and cost. The "Test" line on the Letter of Offer and Acceptance would be managed by the Test Manager located in the System Program Office.

3.9.4.4. Additional test and evaluation should be planned and conducted on a system or a subsystem with Defense Exportability Feature to ensure anti-tamper protection measures and other critical program information or technology protection measures work as expected per DoDD 5200.47E and DoDI 5200.39.

3.9.5. Test Support to Experimentation. The number of activities characterized as experimentation has increased by a DoD-wide push to accelerate defense acquisition. An experiment is an activity that is pursued to explore the potential of newly available technologies coupled with alternative warfighting concepts to inform follow-on acquisition and employment decisions. Unlike traditional research, experimentation puts more emphasis on the military use context. Unlike traditional test and evaluation, experimentation does not set out to confirm achievement of a specification or performance level or operational effectiveness and suitability. In experimentation, the answer to the question posed is not well predicted either through theoretical hypothesis development or design-based modeling and simulation. Experiments typically tolerate greater risks in their conduct except in the area of personnel safety.

3.9.5.1. As in traditional test and evaluation, to be successful, the approach to experimentation should reflect the following:

3.9.5.1.1. Ability to employ a new capability

3.9.5.1.2. Ability to detect change

3.9.5.1.3. Ability to isolate the reason for change

3.9.5.1.4. Ability to relate results to real operations

3.9.5.2. The Program management personnel and test team members should devise experimentation strategies that employ the following process:

3.9.5.2.1. Set clear objectives

3.9.5.2.2. Apply a methodology

3.9.5.2.3. Plan to meet objectives

3.9.5.2.4. Execute per the plan

3.9.5.2.5. Report results

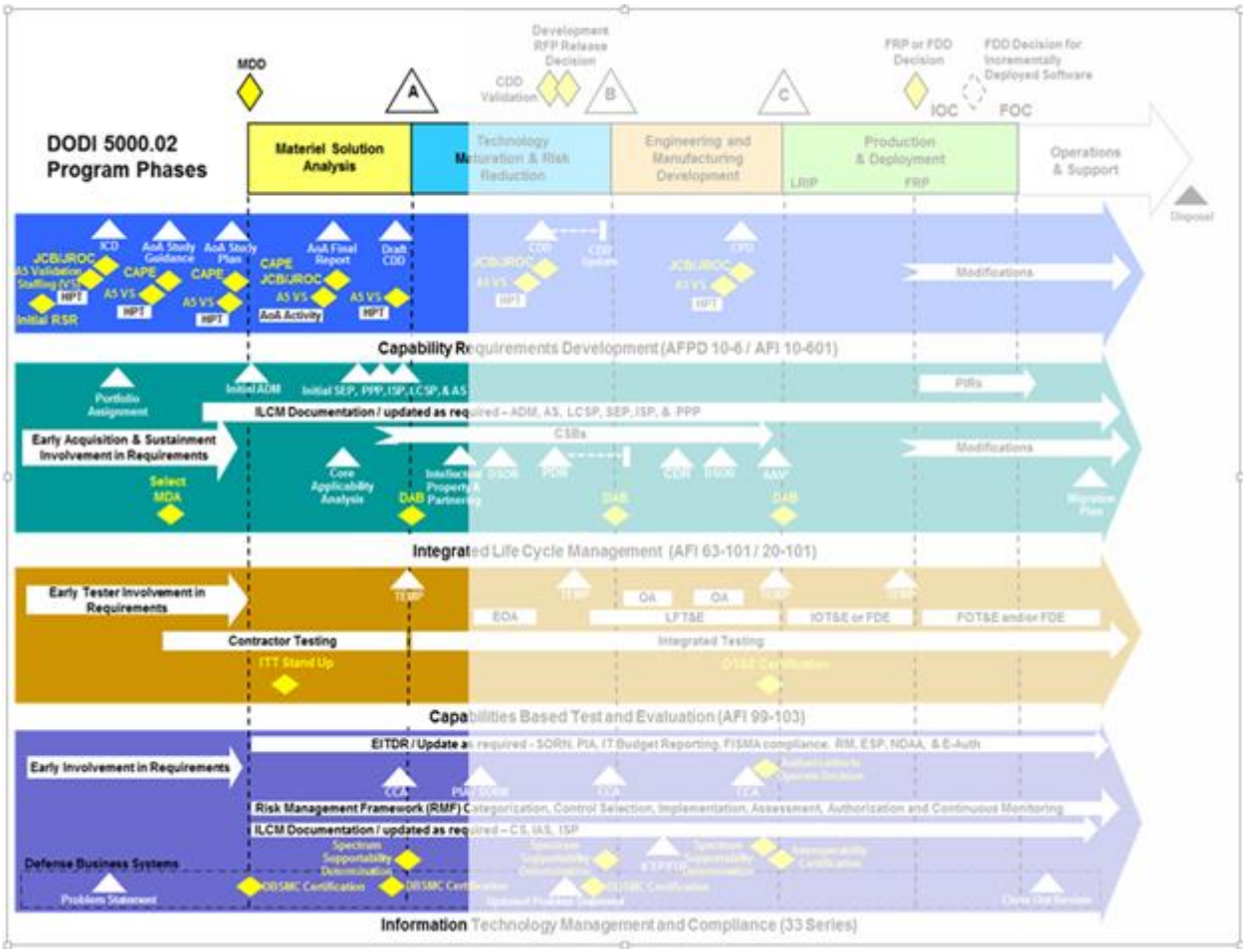
3.9.5.3. While test scope may be reduced, test organizations involved with experimentation efforts will apply the same principles and rigor employed in the conduct of traditional test and evaluation activities and assign clear operational control, administrative control and risk management responsibilities. Specifically, Developmental Test and Operational Test organizations will conduct technical and safety reviews in accordance with **Paragraph 5.21** Test organizations will assess the nature of each experiment to determine the risk of injury or death to personnel as well as property damage. Testers will adhere to standards prescribed by test and safety regulations, and the Lead Developmental Test and Evaluation Organization and Participating Test Organization will hold all experiment co-participants to the same standards. Although the goals of experimentation may differ from test, the approach to reaching those goals does not.

Chapter 4

TEST AND EVALUATION ACTIVITIES SUPPORTING MILESTONE A DECISIONS

4.1. Pre-Milestone A Tester Involvement. The most important activities prior to and during Materiel Solution Analysis that support a Milestone A decision are shown in **Figure 4.1**. This chapter describes testers' roles in these activities. Testers need to be involved in multidisciplinary teams performing developmental planning activities. They must ensure that appropriate test and evaluation information is provided in a timely manner to support the requirements and acquisition processes. This chapter focuses on early team building, strategy development, and establishing baselines for managing test and evaluation activities in this phase and beyond.

Figure 4.1. Integration of Requirements, Acquisition, and Test and Evaluation Events Prior to Milestone A.



4.2. Pre-Milestone A Tester Involvement in Requirements Development. Tester involvement starts with participation in the requirements process described in the AF/A5R Requirements Development Guidebook, Volume 1. As High Performance Team members, the Chief Developmental Tester along with the developmental and operational testers support development of the Requirements Strategy and appropriate requirements documents with technical and operational expertise. Air Force test and evaluation organizations will work with the Chief

Developmental Tester to provide support to High Performance Teams. **(T-1).** Testers review Air Force operating and enabling concepts to fully understand how new systems will be employed and supported. Testers use these documents to support the development of a strategy for test and evaluation and development of test inputs to requests for proposals. Critically, they also ensure that capability requirements are testable. AF/TE, AFOTEC, and MAJCOM representatives participate in the Air Force requirements process.

4.3. Pre-Milestone A Tester Involvement in the Acquisition Process. At this time, a Program Manager should be assigned to lead and fund early studies and collaborate with the Chief Developmental Tester on a strategy for test and evaluation. Early tester involvement helps identify planning and other shortfalls that could result in increased development, operations, and/or life cycle costs. The Chief Developmental Tester must ensure that developmental and operational testers are involved in the collaborative work that produces the Analysis of Alternatives Study Plan, Operational Assessments, Analysis of Alternatives Final Report, Program Protection Plan, Acquisition Strategy, Technology Development Strategy, strategy for test and evaluation, Test and Evaluation Master Plan, Life Cycle Sustainment Plan, cyber test strategy, and the definition of entrance and exit criteria for developmental and operational testing. Early tester involvement is critical to ensuring contractor and government responsibilities are well-defined and codified in the contractual documents; see **Paragraph 5.3**. Pre-Milestone A project or program documentation must address which test organizations will conduct Developmental Test and Evaluation and operational testing as determined from **Paragraph 4.4, Paragraph 4.5,** and **Paragraph 4.6**.

4.4. Formation of the Integrated Test Team. The Program Manager establishes an Integrated Test Team immediately after the Materiel Development Decision to help shape the acquisition strategy and determine test requirements for test and evaluation. The Program Manager assigns a Chief Developmental Tester to chair and form the Integrated Test Team. See **Figure 4.2** for notional Integrated Test Team membership. The Integrated Test Team is a decision-making body and its members must be empowered to speak for their organizations. The Integrated Test Team works together as a cross-functional team to map out the strategy for testing and evaluating a system. All programs must have an Integrated Test Team, but a single Integrated Test Team can cover a number of closely related programs such as the modifications and upgrades embedded in a legacy aircraft program.

4.4.1. Integrated Test Team Quick Start. Identifying appropriate Integrated Test Team organizational membership is critical to ensure program stability. During early program phases (e.g., immediately after the Materiel Development Decision), Integrated Test Team member organizations must send empowered representatives to assist with requirements development, designing the strategy for test and evaluation, recommending the Lead Developmental Test and Evaluation Organization and Operational Test Organization, reviewing early documentation, developing an initial test and evaluation resources estimate, and other appropriate test planning activities as required. The program/project's anticipated Lead Developmental Test and Evaluation Organization and Operational Test organizations will participate in such meetings and activities. A representative from the Air Force Test Center (AFTC) or SMC, dependent on system under test, will assist the Integrated Test Team in the development of initial strategy for test and evaluation and selection of the most appropriate Lead Developmental Test and Evaluation Organization to support the program test requirements. See **Paragraph 3.9.3** for test considerations for programs employing agile software development.

4.4.2. Integrated Test Team Leadership. The program office (or the program's initial cadre) takes the lead in forming an Integrated Test Team with representatives from all needed disciplines. The Chief Developmental Tester or Test Manager will chair the Integrated Test Team with the lead Operational Test Organization's test lead as co-chair. If the Chief Developmental Tester position is vacant, the Program Manager will assume Chief Developmental Tester responsibilities until the position is filled. If the lead Operational Test Organization position is vacant, the Developmental Test Organization will assume the responsibilities until the position is filled. Testers should be proactive in supporting Integrated Test Team initial formation and goals even though they may not be formally tasked before the initial Materiel Development Decision Acquisition Decision Memorandum is signed. Testers who contributed to the Analysis of Alternatives plan or participated in the High Performance Team should form the nucleus of the initial Integrated Test Team.

4.4.3. Integrated Test Team Charter. The Chief Developmental Tester produces a formal charter for approval by the Program Manager and other stakeholders that describes Integrated Test Team membership, responsibilities, Integrated Test Team resources, and the products for which the Integrated Test Team is responsible. Integrated Test Teams may function at two levels: an Executive Level consisting of O-6s and GS-15s from key organizations; and a Working Group Level consisting of organizations needed to fulfill specific Integrated Test Team tasks. Organizational representatives no higher than O-6 or GS-15 coordinate on and sign the Integrated Test Team charter. See the recommended Integrated Test Team charter outline and guidance in the *Air Force Test and Evaluation Guide*.

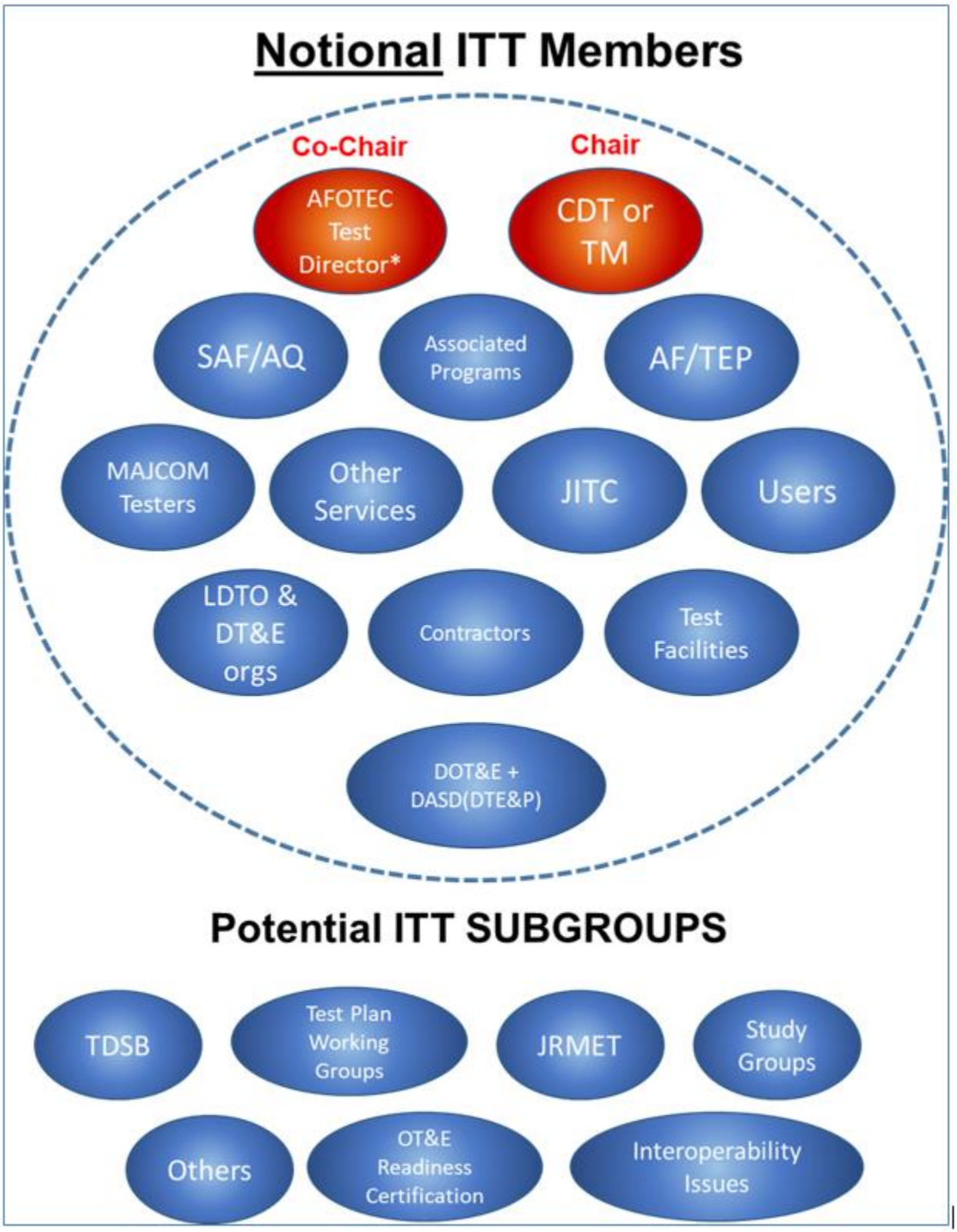
4.4.4. Integrated Test Team Membership. The Integrated Test Team leadership tailors the membership, structure, and protocols as necessary to help ensure program success. Integrated Test Team membership (at the Executive Level and Working Group Level) may vary depending on program needs. The Integrated Test Team should include expertise from organizations such as the program office (or the program's initial cadre), AFOTEC and/or MAJCOM Operational Test Organization as appropriate, Lead Developmental Test and Evaluation Organization, Executing Test Organization, and other Developmental Test and Evaluation organizations, the Center Test Functional Leaders and engineering function, AF/TEP, AF/A3, AF/A5, SAF/CN, JITC, OSD, organizations responsible for cyber and interoperability testing, Security Control Assessors, System Security Engineers, system and support contractors, developers, lab and science and technology organizations, intelligence, requirements sponsors, test facilities, and other stakeholders as needed during various test program phases. Include representatives from the other Services if testing a multi-Service program. Also include the implementing command headquarters and Air Education and Training Command, if required.

4.4.5. Integrated Test Teams for Interoperable Systems. If a system is dependent on the outcome of other acquisition programs, or must provide capabilities to other systems, those dependencies must be detailed in the acquisition strategy and other program documentation. The Integrated Test Team charter should reflect those dependencies by including representatives from the other programs as needed who can address interoperability testing requirements.

4.4.6. Subgroups. The Integrated Test Team charter should direct the formation of subgroups (e.g., Test Integrated Product Teams, Test Data Scoring Boards, study groups, review boards) to write test plans and handle specific test issues as needed. These subgroups would not require

full Integrated Test Team participation. A “test team” is a group of testers and other experts who are responsible for specific test issues or carry out integrated testing according to specific test plans. There may be multiple Test Integrated Product Teams and test teams associated with an Integrated Test Team.

Figure 4.2. Integrated Test Team.



*May be MAJCOM Operational Test Organization if AFOTEC not Operational Test Organization

4.4.7. Operational MAJCOM Roles. MAJCOM operational testers are required to participate in the Integrated Test Team at program inception when AFOTEC is not the lead Operational Test Organization. In this case, they must assume the Integrated Test Team co-chair position and conduct required operational testing.

4.4.7.1. When AFOTEC is the lead Operational Test Organization, MAJCOM operational testers should plan for transition of these responsibilities according to **Paragraph 4.6**. Test and Evaluation Master Plans must reflect this transition. Additionally, the MAJCOM provides operational users for the conduct of operational testing.

4.4.7.2. The MAJCOM is responsible for informing the Integrated Test Team how the system under test will be employed. This is typically done through a Concept of Operations.

4.4.8. Charter Updates. Integrated Test Team charters are reviewed and updated after each major decision review to ensure testing is integrated as much as possible within statutory and regulatory guidelines. Changes in membership should reflect the skills required for each phase of the program. The Integrated Test Team's responsibilities are described in **Paragraph 2.20**.

4.4.9. Integrated Testing and the Test and Evaluation Master Plan. After the Materiel Development Decision, the Integrated Test Team must begin integrating all test and evaluation activities to include contractor testing. The Test and Evaluation Master Plan must outline how all testing will be integrated, addressing the overall evaluation approach, key evaluation measures, and the major risks or limitations to completing the evaluations. Test and evaluation planners must develop strategies for embedded and stand-alone information technology sub-systems to include cyber testing. The Test and Evaluation Master Plan must integrate and synchronize, to the extent possible, developmental and operational test activities. The principles, guidelines, and strategies of the Test and Evaluation Master Plan shall be reflected in all supporting documents and contracts with all stakeholders. For additional guidance, see: the AF/TE Test and Evaluation Master Plan Guide found at **https://haf-te.sharepoint.afncr.af.mil/SitePages/Home.aspx** and the *DOT&E Test and Evaluation Master Plan Guidebook*: **http://www.dote.osd.mil/tempguide/index.html**.

4.5. Determining the Lead Developmental Test and Evaluation Organization. The Lead Developmental Test and Evaluation Organization is the lead government developmental test and evaluation organization responsible for a program's developmental test and evaluation in accordance with **Paragraph 2.18**. For complex programs, the Lead Developmental Test and Evaluation Organization may build a confederation of Developmental Test and Evaluation Organizations with appropriate skill mixes by enlisting the support of other Participating Test Organizations as needed. The Lead Developmental Test and Evaluation Organization serves as the lead integrator and "single-face-to-the-customer," working closely with the program's Chief Developmental Tester or Test Manager for purposes of planning, executing and reporting Developmental Test and Evaluation. For less complex programs, the Lead Developmental Test and Evaluation Organization may be solely responsible for overseeing and/or conducting all or most of the relevant Developmental Test and Evaluation. All Major Defense Acquisition Programs and Major Automated Information System programs will be supported by a government Developmental Test and Evaluation Organization serving as Lead Developmental Test and Evaluation Organization. All other Air Force programs will select a government Developmental Test organization as Lead Developmental Test and Evaluation Organization unless an alternate

organization (only possible for low risk Acquisition Category or Business System Category III programs that are not on any oversight list and have proper Program test representation) is determined to be the best course of action by the Program Executive Officer and approved by AFMC/A3 and/or AFSPC/TE in accordance with **Paragraph 4.5.3** Developmental Test may be accomplished by an Executing Test Organization under Lead Developmental Test and Evaluation Organization oversight.

4.5.1. Appropriate Lead Developmental Test and Evaluation Organizations. AFMC/A3 will develop lists of Lead Developmental Test and Evaluation Organization qualifications and candidate Lead Developmental Test and Evaluation Organizations for their programs of record and weapon systems. Request current lists by contacting the following AFMC office: AFMC/A3F Lead Developmental Test and Evaluation Organization Workflow (**afmc.a3f.ldtoworkflow@us.af.mil**). Specifically, for space programs of record and weapon systems, AFSPC/TE will develop lists of space Lead Developmental Test and Evaluation Organization qualifications and candidate space Lead Developmental Test and Evaluation Organizations. Request current space lists by contacting the following AFSPC office: AFSPC/TE (**afspc.te.workflow@us.af.mil**). Developmental test organization candidates should have experience with the relevant system domain(s) and leading other organizations. During system development, the skills of several developmental test organizations may be needed, but only one will be designated as the Lead Developmental Test and Evaluation Organization. In all cases, the confederation of Developmental Test and Evaluation Organizations must be qualified to oversee and/or conduct the required Developmental Test and Evaluation and must be capable of providing objective analysis and judgment. The designation as Lead Developmental Test and Evaluation Organization does not require all associated Developmental Test and Evaluation activities to be conducted by the Lead Developmental Test and Evaluation Organization itself or at a single geographic location. While there are many Lead Developmental Test and Evaluation Organizations, the AFTC has primary Lead Developmental Test and Evaluation Organization capability and responsibility for aircraft, air armament, avionics, cybersecurity, and electronic warfare testing.

4.5.1.1. **(Added-AFMC)** The AFMC Form 42 contains a link in the upper right hand corner to the list of approved LDTOs and a link to form instructions in the upper left hand corner.

4.5.1.2. **(Added-AFMC)** DT&E organizations requesting to be listed on the AFMC Form 42 will follow **Attachment 3**. Submit the completed paperwork to AFMC/A3/6 for approval to be added to the approved AFMC LDTO list.

4.5.2. Lead Developmental Test and Evaluation Organization Selection. The Integrated Test Team initiates selection of a Lead Developmental Test and Evaluation Organization when building the strategy for test and evaluation prior to Milestone A, if possible. Lead Developmental Test and Evaluation Organization selection must be based on a thorough review of required Developmental Test and Evaluation skill sets and human and capital resources that are best suited and available for each program. Lead The Integrated Test Team submits their selection to the Program Manager along with a capabilities and resource analysis. Lead Developmental Test and Evaluation Organization nominations will be coordinated with the Program Executive Officer before submission to AFMC/A3 and/or AFSPC/TE for approval. After approval of the selection, AFMC/A3 and/or AFSPC/TE (as appropriate), notifies the Program Manager and the program element monitor within 30 calendar days.

Note: the program element monitor is the person from the Secretariat or Air Staff who has overall responsibility for the program element and who harmonizes program documentation.

4.5.2. **(AFMC)** The LDTO designations process is documented on the AFMC Form 42. Multiple Executing Test Organizations may be designated on the AFMC Form 42. An approved LDTO or Alternate LDTO designation is required before planned testing begins.

4.5.3. Alternate Lead Developmental Test and Evaluation Organization Option. Referred to as an "alternate-Lead Developmental Test and Evaluation Organization," this designated option is by exception and only authorized for low risk (as defined by the MAJCOM) Acquisition Category or Business System Category III programs that are not on any oversight list and have proper Program test representation. An alternate organization may be designated in lieu of a Lead Developmental Test and Evaluation Organization to oversee the functions described in **Paragraph 2.18** Alternate Lead Developmental Test and Evaluation Organization nominations will be coordinated with the Program Executive Officer before submission to AFMC/A3 and/or AFSPC/TE for approval. After the approval of the selection, AFMC/A3 and/or AFSPC/TE (as appropriate) notifies the Program Manager, AF/TE, and the program element monitor within 30 calendar days.

4.5.3.1. Program Management Office Lead Developmental Test and Evaluation Organization. The Program Management Office Lead Developmental Test and Evaluation Organization is a subset of the Alternate Lead Developmental Test and Evaluation Organization option. The Program Management Office Lead Developmental Test and Evaluation Organization option allows the program office to perform the Lead Developmental Test and Evaluation Organization oversight function.

4.5.3.1.1. **(Added-AFMC)** The Program Manager Office will have a trained and qualified Test Manager prior to nominating an Alternate PMO LDTO **(T-2)**.

4.5.3.1.2. **(Added-AFMC)** The Program Management Office will follow **Attachment 3** provide the documentation with their AFMC Form 42.

4.5.3.2. Each Alternate Program Management Office Lead Developmental Test and Evaluation Organization request and accompanying rationale must be considered on a case-by-case basis; there is no blanket policy. The AFMC or SMC Center Test Authority will review each Program Management Office Lead Developmental Test and Evaluation Organization request and coordinate with Program Executive Officer prior to submitting to AFMC/A3 or AFSPC/TE for approval.

4.5.3.3. **(Added-AFMC)** If the independent technical and safety reviews identify an increase above "low" risk, the program office, the Center Test Authority, and Center Safety Office will mitigate the risk to "low". **(T-2)**. If the risk cannot be mitigated, the program office will select an AFMC-approved LDTO. **(T-2)**.

4.6. Determining the Operational Test Organization. The Operational Test Organization for all programs and projects will be determined using the three-column flowchart in **Figure 4.3**. The flowchart identifies the responsible (default) Operational Test Organization for Air Force acquisition programs based on program Acquisition Category, OSD Operational Test and Evaluation Oversight status, and multi-Service applicability. The flowchart also identifies a process to transfer operational test responsibilities from MAJCOM test organizations to AFOTEC when requested by the MAJCOM and accepted by AFOTEC. Any such change must be

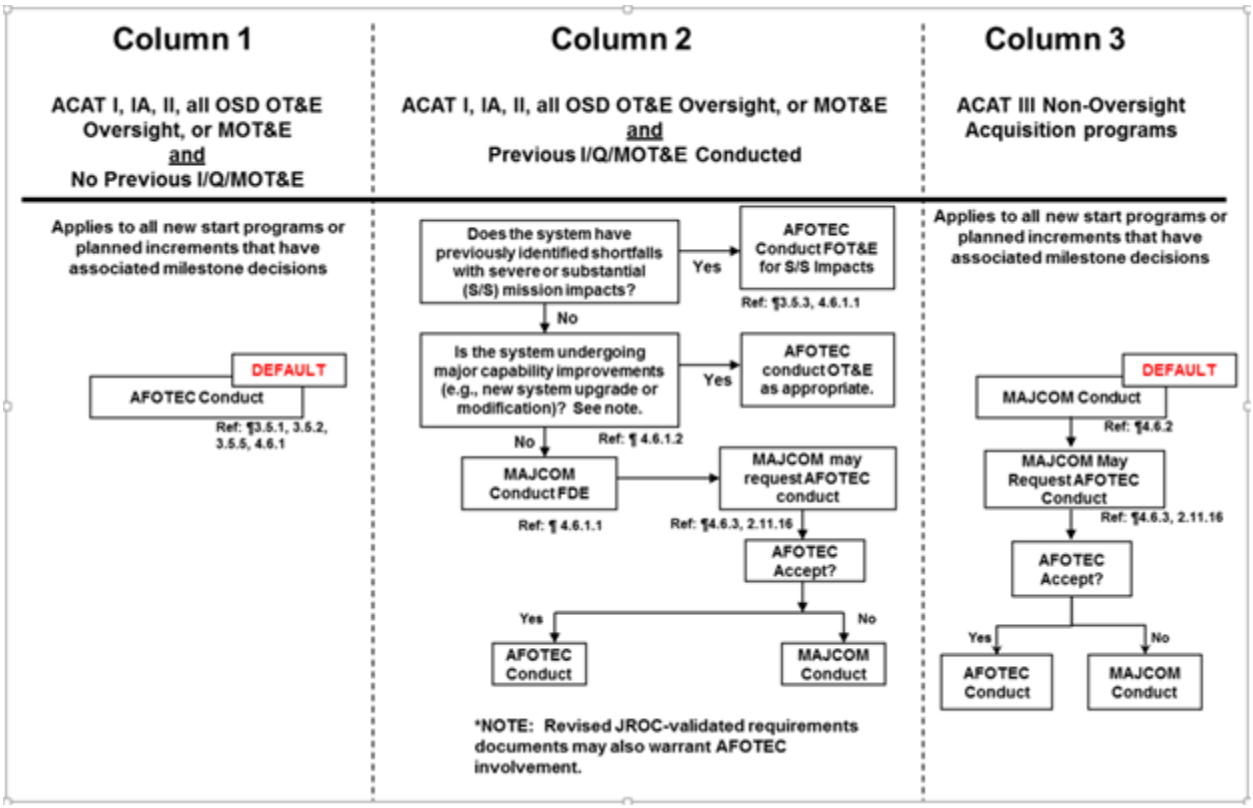
coordinated with the Program Manager. The flowchart will be used according to the following Paragraphs (references cited in **Figure 4.3**).

4.6.1. Programs Requiring AFOTEC Conduct. As the Air Force Operational Test Agency, AFOTEC conducts operational testing for Acquisition Category I, IA, II, OSD Operational Test and Evaluation Oversight, and multi-Service acquisition programs as shown in Column 1 of **Figure 4.3**. AFOTEC also conducts Follow-on Operational Test and Evaluation for programs as described in **Paragraph 3.5.3** and as shown in Column 2. AFOTEC involvement will end at the completion of Follow-on Operational Test and Evaluation (or Initial/Qualification/Multi-service Operational Test and Evaluation if no Follow-on Operational Test and Evaluation is required) unless AFOTEC and the user MAJCOM otherwise mutually agree and document in the Test and Evaluation Master Plan or other program documentation.

4.6.1.1. If a program has completed Initial/Qualification/Multi-service Operational Test and Evaluation with deficiencies or shortfalls having severe or substantial mission impacts, as identified in the AFOTEC final report, AFOTEC normally conducts Follow-on Operational Test and Evaluation for those deficiencies as shown at the top of Column 2. AFOTEC and the appropriate MAJCOM may mutually agree to allow the MAJCOM to conduct further testing for mission impacts rated substantial. When these post-Initial/Qualification/Multi-service Operational Test and Evaluation programs have no deficiencies with severe or substantial mission impacts, the MAJCOM is responsible for continued operational testing.

4.6.1.2. If a program has modifications, upgrades, etc., that are large enough to be considered new acquisition programs, required operational testing will be conducted for the new program by the appropriate Operational Test Organization in accordance with **Figure 4.3**. In these instances, systems normally re-enter the acquisition process at a milestone commensurate with the Acquisition Strategy. An additional indicator that a program may warrant AFOTEC involvement is the presence of new or revised operational Capability Requirements Document validated by the Joint Requirements Oversight Council. Multi-service Force Developmental Evaluation may be assigned to a MAJCOM by mutual agreement with AFOTEC.

Figure 4.3. Determining the Operational Test Organization.



4.6.2. Programs Requiring MAJCOM Conduct. As shown in **Figure 4.3**, Column 3, MAJCOM Operational Test Organizations conduct required operational testing for Acquisition Category III programs. MAJCOMs continue conducting operational testing for all routine post- Initial/Qualification/Follow-on/Multi-service Operational Test and Evaluation fielded system upgrades, deficiency corrections, and sustainment programs as required. See **Paragraph 2.11.1** for lead command designation. MAJCOMs may request AFOTEC to assume responsibility for operational testing (see **Paragraph 4.6.3**) and/or may request support according to **Paragraph 2.11.16** and **Paragraph 4.6.6.1**

4.6.3. MAJCOM Requests for AFOTEC Re-Involvement. Post- Initial/Qualification/Multi-service Operational Test and Evaluation and post-Follow-on Operational Test and Evaluation, MAJCOMs may request that AFOTEC remain involved (or become re-involved) in programs that are normally a MAJCOM responsibility (see right side of **Figure 4.3**, Column 2). These requests must include required documentation (i.e., Joint Capabilities Integration and Development System documents, enabling and operating concepts, and Acquisition Strategy) needed for AFOTEC to make an informed involvement decision. AFOTEC uses a repeatable, documented process with clearly defined criteria to determine post- Initial/Qualification/Multi-service Operational Test and Evaluation or post-Follow-on Operational Test and Evaluation involvement. AFOTEC documents their decision and provide timely notification to the MAJCOM test and evaluation office of primary responsibility and AF/TEP. If the response time exceeds 30 calendar days, AFOTEC informs the MAJCOM on the reason for delay. Acceptance of test responsibility also means providing funds for test execution according to operational test funding guidance in AFMAN 65-605V1.

4.6.4. Some acquisition program schedules may require MAJCOM testing of follow-on modifications, preplanned product improvements, and upgrades simultaneously with planned AFOTEC Follow-on Operational Test and Evaluation. In these instances, AFOTEC and operational MAJCOM testers coordinate through the Integrated Test Team on the most efficient strategy for completing the required testing.

4.6.5. AFOTEC Requests to Transfer Operational Test and Evaluation Responsibilities.

4.6.5.1. AFOTEC requests to transfer any operational test responsibilities should be coordinated and resolved not later than 18 months prior to the first scheduled or required operational test event. Transfer of operational test responsibility requests less than 18 months prior to test start may only be done by mutual agreement of all parties and AF/TE concurrence.

4.6.5.2. In some cases, operational testing for an AFOTEC-supported program in **Figure 4.3**, Column 1, may be more appropriately executed by a MAJCOM Operational Test Organization. If AFOTEC and the MAJCOM(s) mutually agree, AFOTEC requests an exception to policy from AF/TEP. The request must include whether the program is on OSD Operational Test and Evaluation Oversight, the Acquisition Category level, phase of program development, rationale for the change, any special conditions, and written MAJCOM concurrence.

4.6.6. Miscellaneous Provisions.

4.6.6.1. Despite having a designated lead command per AFPD 10-9, some Acquisition Category III, non-OSD Oversight programs support multiple users with differing requirements across an entire AF-wide enterprise area. The lead MAJCOM and AFOTEC will negotiate an Operational Test and Evaluation involvement role per Column 3 of **Figure 4.3**, or coordinate with appropriate MAJCOM test and evaluation office of primary responsibility for a multi-MAJCOM/AFOTEC test approach.

4.6.6.2. Some programs may not be clearly “owned” by a MAJCOM or sponsor with an organic operational test function. In these cases, the program’s sponsor coordinates with AFOTEC to identify an appropriate Operational Test Organization, with respective MAJCOM concurrence, to complete any required operational testing. If an appropriate Operational Test Organization cannot be identified, the sponsor contacts AF/TE for guidance.

4.6.6.3. If the Program Office, the Operational Test Organization, and lead MAJCOM test and evaluation office of primary responsibility mutually agree that no operational testing is necessary, the Lead Developmental Test and Evaluation Organization provides relevant Developmental Test and Evaluation data that supports the option to not conduct operational testing. The Operational Test Organization reviews the Lead Developmental Test and Evaluation Organization’s work, assesses the risk of accepting that work, and documents their assessment with a Sufficiency of Operational Test Review according to **Paragraph 3.5.11** and **Paragraph 7.4.5**

4.6.6.4. Multiple Operational Test Organizations. If multiple Operational Test Organizations within the Air Force are tasked to conduct testing concurrently, the Integrated Test Team must be notified before planning begins and a lead Operational Test Organization is designated. All operational test plans must be reviewed by, and reports

coordinated with, the lead Operational Test Organization to ensure continuity of effort. This information must be updated in the Test and Evaluation Master Plan, test plans, and other documentation when appropriate. For OSD Operational Test and Evaluation Oversight programs, the lead Operational Test Organization complies with all Oversight requirements according to **Attachment 2**.

4.7. OSD Test and Evaluation Oversight and Approval. DOT&E publishes a list of acquisition and sustainment programs requiring OSD Test and Evaluation Oversight and monitoring. The master list has sub-parts for Live Fire Test and Evaluation and Operational Test and Evaluation. Program Managers and Chief Developmental Testers must contact AF/TE as early as possible to determine if their program is on this list due to additional workload and reporting requirements.

4.7.1. Additional Workload and Reporting. Continuous coordination with AF/TEP and the assigned DD(DTE&P) and DOT&E action officers is required for programs on OSD Test and Evaluation Oversight. Integrated Test Teams will invite AF/TEP and OSD action officers to Integrated Test Team meetings and decision reviews, and coordinate draft Test and Evaluation Master Plans, test plans, and other program-related documentation as the program unfolds. **(T-1).** **Attachment 2** contains a succinct summary of information requirements.

4.7.1.1. Selected Developmental Test and Evaluation plans and acquisition documents for programs on OSD Developmental Test and Evaluation Oversight may require DD(DTE&P) review and/or approval. DOT&E may require a test concept briefing for selected test programs. Program Managers and Lead Developmental Test and Evaluation Organizations will respond promptly to requests for Developmental Test and Evaluation plans, test concept briefings, or other test and evaluation documentation.

4.7.1.2. When Live Fire Test and Evaluation is required for "covered systems" in accordance with AFI 63-101_20-101, these programs are placed on the Live Fire Test and Evaluation part of the OSD Test and Evaluation Oversight list. Program Executive Officers must continually review their portfolios for any programs "covered" under AFI 63-101_20-101. The Program Manager is responsible to help identify these programs. DOT&E approval of the Live Fire Test and Evaluation plan is required before commencing tests. In certain cases, Live Fire Test and Evaluation waivers are appropriate and must be obtained before Milestone B. See details in **Paragraph 5.8.4**

4.7.1.3. Operational testing for programs on OSD Operational Test and Evaluation Oversight may not start until DOT&E approves the adequacy of the test plans in writing. DOT&E requires approval of Early Operational Assessments, Operational Assessments, Operational Utility Evaluations, Force Development Evaluation, and Operational Test and Evaluation plans, and requires a test concept briefing 180 calendar days prior to test start for each of these plans. For test plans that are integrated, DOT&E approval is only required on the operational test portions prior to the start of operational testing. See **Paragraph 6.6** and **Paragraph 6.7** for more details about DOT&E's requirements.

4.7.2. Coordination Prior to Approval. Program offices and Operational Test Organizations should endeavor to coordinate test plans and concepts with all Integrated Test Team stakeholders as early as possible. Program offices, Lead Developmental Test and Evaluation Organizations, and Operational Test Organizations (as appropriate) will route Developmental Test and Evaluation, Live Fire Test and Evaluation, operational test plans (e.g., Early Operational Assessment, Operational Assessment, and Initial Operational Test and

Evaluation), and test concepts requiring OSD approval through AF/TE before submission to OSD. AF/TEP will assist with the review, coordination, and submission of these documents.

4.7.3. OSD Oversight Programs with Multiple Subparts. Some Test and Evaluation Oversight programs, although listed as a single entity, have multiple subparts, each with its own set of test planning and reporting requirements to satisfy OSD's statutory obligations. OSD representatives to the Integrated Test Team should identify which subparts are relieved of these requirements. In addition, some OSD Oversight programs may use or consist of components from non-OSD Oversight programs. As a result, these components may be subject to OSD test plan approval and reporting. The Integrated Test Team co-chairs document the subcomponents that are under OSD Oversight and notify AF/TE, the Program Manager and the Program Executive Officer.

4.7.4. OSD Test and Evaluation Oversight List Updates. The most current lists are maintained at **https://extranet.dote.osd.mil/oversight/index.html**. This list is frequently updated and new programs are added without official notice. Contact AF/TEP for more information about the most current list. All test organizations should forward recommended additions or deletions to AF/TEP.

4.7.5. Interoperability. Interoperability testing must be comprehensive, cost effective, completed, and interoperability certification granted, before fielding of a new information technology capability or upgrade.

4.7.5.1. An interoperability Developmental Test plan must be referenced in the Test and Evaluation Master Plan and interoperability demonstrated by Milestone C to support interoperability certification during Initial Operational Test and Evaluation. Program Managers and Integrated Test Teams must coordinate closely with JITC under Defense Information Systems Agency to review the net-ready-key performance parameters and ensure test plan adequacy to verify the system meets these performance requirements, Test and Evaluation Master Plans, test criteria, and associated developmental and operational test plans for interoperability. This same review must be accomplished for information technology programs with joint, multinational, or interagency interoperability requirements. AF/A2 must ensure interoperability test, evaluation and certification of ISR national security system before connection to an intelligence community network. JITC must ensure interoperability test, evaluation, and certification of information technology before connection to a DoD network. Program Managers must also submit an Information Support Plan along with the Test and Evaluation Master Plan prior to each milestone or Critical Design Review, or when significant modifications to the program occur. See DoDI 8330.01.

4.7.5.2. Operating at Risk List. The Air Force representative to the DoD Chief Information Officer (CIO) Interoperability Steering Group may track and place any information technology or national security system with significant interoperability deficiencies, or is not making significant progress toward achieving Joint Interoperability Test Certification, on the Operating at Risk List. Listed programs may transition to the OSD Test and Evaluation Oversight List. Defense Information Systems Agency maintains the Operating at Risk List listing all information technology systems denied an Interim Certificate to Operate and have not received a waiver. See DoDI 8330.01.

4.8. Lead Service Considerations. When the Air Force is designated the lead service for multi-service test and evaluation, the Integrated Test Team will document the other services' test and evaluation responsibilities, resources, and methods to eliminate conflicts and duplication. When the Air Force is not the lead Service, Air Force testers follow the lead service's test and evaluation policies. See the *Defense Acquisition Guidebook* and the memorandum of agreement on Multi-service Operational Test and Evaluation and joint test and evaluation, **http://www.dote.osd.mil/pub/index.html**, for more information.

4.9. Tester Inputs during Materiel Solution Analysis. Developmental and operational testers with input from the Chief Developmental Tester shall assist requirements sponsors, acquisition planners, and systems engineers in developing Analysis of Alternatives and Operational Assessments. Testers provide test and evaluation inputs for each alternative developed. Criteria, issues, Critical Operational Issues, Critical Technical Parameters, measures of effectiveness, and measures of suitability developed for these documents are later used for developing the strategy for test and evaluation and subsequent test and evaluation plans.

4.10. Developing Test Measures. During the Materiel Solution Analysis phase, developmental and operational testers should begin drafting clear, realistic, and testable measures to support the strategy for test and evaluation, the Milestone A decision, and future test plans. The feasibility of applying Scientific Test and Analysis Techniques methodologies (as defined in **Paragraph 5.13**) to these measures should be carefully considered to facilitate testability. These measures are refined and evolve as more information becomes available during and after the Materiel Solution Analysis phase. Developmental Test and Evaluation practitioners assist systems engineers in developing critical system characteristics (i.e., Critical Technical Parameters) that when achieved, allow the attainment of operational performance requirements. Operational testers draft Critical Operational Issues, Measures of Effectiveness, and Measures of Suitability for operational testing purposes. The goal is to ensure all measures are traceable to key system requirements and architectures, and correlate to the Key Performance Parameters and Key System Attributes. These measures guide the Program Manager when writing system specifications for contractual purposes. The best way to ensure complete coverage and correlation is to list them in the Developmental Evaluation Framework that becomes part of the Milestone A Test and Evaluation Master Plan.

4.11. Test and Evaluation Master Plan. The Test and Evaluation Master Plan documents the overall structure and objectives of the program's integrated and synchronized test and evaluation activities as well as test resource requirements to support acquisition milestones or decision points, and ultimately, a full-rate production or full deployment decision. The Test and Evaluation Master Plan integrates the requirements, acquisition, test and evaluation, systems engineering, and sustainment strategies with all test and evaluation schedules, funding, and resources into an efficient continuum of integrated testing. The Program Manager, working through the Integrated Test Team, is responsible for preparing Test and Evaluation Master Plans for Milestone A, Requests for Proposal, Milestone B, Milestone C, and Full Rate Production and Full Deployment decisions for all acquisition programs. All AF acquisition or sustainment programs requiring Developmental Test and/or Operational Test to support a production or fielding decision require a Test and Evaluation Master Plan regardless of where the program enters the acquisition life cycle. Program Managers may tailor the content of the Test and Evaluation Master Plan to fit individual program needs and satisfy Milestone Decision Authority requirements.

4.11.1. Test and Evaluation Master Plan Requirements. The Test and Evaluation Master Plan must show that the test strategy will allow testers to obtain adequate data to support the decision makers. The Test and Evaluation Master Plan should include:

4.11.1.1. Objectives

4.11.1.2. Schedule

4.11.1.3. Evaluation Framework(s)

4.11.1.4. Resources

4.11.2. The Test and Evaluation Master Plan should ensure adequacy of resources, funding, and data. The Test and Evaluation Master Plan should also include Paragraphs describing intended strategy and resources for each of the following: Technical Performance and Requirements; Mission Performance; Reliability, Availability, and Maintainability; Cybersecurity; Lethality; Survivability; Interoperability; Test Program Risks and Limitations; Modeling and Simulation; and individual test descriptions, if applicable. Performance parameters and test measures will be captured in the test plans, not the Test and Evaluation Master Plan. Strive to keep the Test and Evaluation Master Plan to 30 pages or less in length.

4.11.3. Test and Evaluation Master Plan Submittal and Coordination. The Test and Evaluation Master Plan should be coordinated through stakeholders in the Integrated Test Team but only submitted for signature/approval by the Program Manager, AFTC or Lead Developmental Test and Evaluation Organization, AFOTEC or Operational Test Organization, Milestone Decision Authority, AF/TE, DD(DTE&P), and DOT&E. All Air Force Test and Evaluation Master Plans will include a signature block for the Lead Developmental Test and Evaluation Organization next to the Operational Test Organization.

4.11.3.1. The Integrated Test Team forwards a Test and Evaluation Master Plan draft "in parallel" to all stakeholder organizations represented on the Integrated Test Team for pre-coordination review. Integrated Test Team representatives are expected to verify concurrence or identify outstanding issues within 30 calendar days. Dissenting organizations must provide a position statement, to include alternatives, or formal non-concurrence on the draft Test and Evaluation Master Plan within this timeframe. Following this pre-coordination period, the Program Manager signs the Test and Evaluation Master Plan, sends it to the appropriate Center Test Authority for coordination, and then staffs it in parallel to the AFTC, Lead Developmental Test and Evaluation Organization, and AFOTEC or Operational Test Organization. After "concurrence signatures" are obtained, the Test and Evaluation Master Plan will be forwarded to the Air Staff, through the Milestone Decision Authority, for Air Force and OSD coordination and approval.

4.11.3.2. For all OSD Test and Evaluation Oversight programs, the Program Executive Officer will submit the Test and Evaluation Master Plan to SAF/AQE for HAF staffing. The Program Executive Officer will coordinate through required Air Staff offices (to include AF/TE and the Service Acquisition Executive, in that order) for formal Service-level approval. After Service Acquisition Executive signature, the Program Executive Officer will submit the Test and Evaluation Master Plan to DD(DTE&P) and DOT&E.

4.11.3.3. For all other programs not requiring OSD approval, the program element monitor will ensure the Service Acquisition Executive (or designated representative) signs as the

final Service approval authority. AF/TE will sign prior to the Service Acquisition Executive as the "DoD Component Test and Evaluation Director." If the Service Acquisition Executive is not a signatory, no signature is required for the "DoD Component Test and Evaluation Director."

4.11.4. Schedule. The Program Manager should initiate Test and Evaluation Master Plan coordination sufficiently early to address stakeholder issues and meet Milestone decision review. Test and Evaluation Master Plans requiring OSD approval should meet the following timelines: the Test and Evaluation Master Plan should be submitted to the Program Executive Officer for review and signature 120 calendar days prior to the decision review. The Program Executive Officer signs and submits the Test and Evaluation Master Plan via SAF/AQ Workflow not later than 90 calendar days prior to the decision review for HQ USAF (i.e., Service-level) coordination and AF/TE and Service Acquisition Executive approval/signature. Not later than 45 calendar days prior to the decision review, the Service Acquisition Executive sends the Test and Evaluation Master Plan to OSD for review and approval. The Service Acquisition Executive submits the final Service-approved Test and Evaluation Master Plan 10 calendar days prior to the decision review for final OSD approval. See **Attachment 2** for a summary of coordination requirements. These timelines may be adjusted for rapid acquisition and agile software development programs.

4.11.5. Multi-Service Test and Evaluation Master Plans. The lead Service is responsible for coordinating multi-Service Test and Evaluation Master Plans. Signatures from the "concurrence signature" organizations in the other participating Services must be obtained before Test and Evaluation Master Plan submission to the Program Executive Officer, who submits in turn to the Service test and evaluation executives, the Service Acquisition Executives (or Milestone Decision Authority if appropriate), and OSD. Program Managers should consider additional time required for other Service coordination.

4.11.6. Test and Evaluation Master Plan Updates and Administrative Changes. The Program Manager and Integrated Test Team will:

4.11.6.1. Make updates to the Test and Evaluation Master Plan whenever significant revisions impact the program or test and evaluation execution as defined by the Program Manager, DOT&E, DD(DTE&P), or AF/TE. Updates are required prior to major milestones and will be staffed as described in **Paragraph 4.11.3** **Note**: Updates are any revisions that alter the substantive basis of the Milestone Decision Authority certification or otherwise cause the program to deviate significantly from the material previously presented, or if the conditions that formed the basis for the original agreement have changed. (DoDI 5000.02, Enclosure 1, **Table 4**, contains general guidance about what constitutes an update.)

4.11.6.2. Make administrative changes for small corrections or modifications to the Test and Evaluation Master Plan. Administrative changes do not impact test and evaluation execution and do not require full coordination as described in **Paragraph 4.11.3**. Provide an errata page listing these changes.

4.11.7. When a Test and Evaluation Master Plan is No Longer Required. Once a program's acquisition is complete and Critical Operational Issues are satisfactorily resolved, a Test and Evaluation Master Plan may no longer be required. For programs on OSD Test and Evaluation Oversight, the Integrated Test Team should initiate requests to cancel the Test and Evaluation

Master Plan. Submit such requests and justification through AF/TE to OSD. For non-oversight programs, Test and Evaluation Master Plan cancellation is at the discretion of the Integrated Test Team.

4.12. Lead Developmental Test and Evaluation Integrator. The Chief Developmental Tester functions as the "Lead Developmental Test and Evaluation Integrator," interfacing as needed with all other representatives on the Integrated Test Team and maintaining insight into contractor activities. The Chief Developmental Tester ensures all necessary organizations with specialized skills contribute to Test and Evaluation Master Plan development.

4.13. Reliability Growth Planning. Planning for reliability starts with testers participating in High Performance Teams to help ensure operational reliability requirements are correctly written, reflect realistic conditions, and are testable. Testers work with the program's systems engineers in the allocation of reliability among critical components, determining the amount of testing and resources required, and developing the plan for improving reliability as development progresses. These items, among others, are necessary when designing the system and the test program. They are outlined in the System Engineering Plans and Life Cycle Sustainment Plan. Also see AFI 63-101_20-101, Department of Defense Handbook, *Reliability Growth Management* (Military Handbook (MIL-HDBK) 189C), and the *DoD Guide for Achieving Reliability, Availability, and Maintainability.*

4.14. Program Protection. The Program Manager is responsible for ensuring sufficient efforts are taken to prevent technology transfer to adversaries as well as assessing risks to the supply chain. Program protection measures will be employed throughout the acquisition life cycle to include cybersecurity and anti-tamper and documented in the Program Protection Plan and Risk Management Framework Security Plan. These measures will be assessed and evaluated through a comprehensive test and evaluation program. The Program Protection Plan will be submitted with the Milestone A Test and Evaluation Master Plan and included with each subsequent Test and Evaluation Master Plan.

4.14.1. Cybersecurity Strategy. The Cybersecurity Strategy outlines the implementation of cybersecurity risk management throughout the program acquisition life cycle. The Cybersecurity Strategy must indicate the most recent approval status of the Risk Management Framework Security Plan. The Cybersecurity Strategy should describe how mission critical components identified in the Program Protection Plan will be protected. Cyber test planning, to include cybersecurity and cyber resiliency testing, will be based on the information provided by the Cybersecurity Strategy and will be included in the Test and Evaluation Master Plan.

4.14.2. Development of systems designed to operate in a contested cyber domain. Testing of systems that operate in cyberspace should evaluate the system's ability to protect (cybersecurity testing), detect, and react (cyber resiliency testing) to a cyber attack and continue the mission.

4.14.3. Anti-Tamper. Anti-tamper is documented as an appendix to the Program Protection Plan and is updated prior to each milestone. The anti-tamper verification and validation plan and testing of the anti-tamper design will be coordinated with SAF/AQLS and completed before prior to Full Rate Production and Full Deployment decision.

4.15. Pre-Milestone A Planning for Test and Evaluation Resources. Securing Test and Evaluation Ranges and Facilities. Test planners must contact potential test sites early to obtain

estimates of costs, availability, and test priority. Test planners should ascertain how each range or site establishes priorities among programs on that range, and what to submit to gain access. AFMC A3, AFSPC/TE, or ACC/A3 and the range or facility points of contact will provide information and assistance on using the Major Range and Test Facility Base and other government test facilities. See AFMAN 13-212V1, *Range Planning and Operations*, for information on the use of test and training ranges. The USAF Test and Evaluation Organizations and Facilities Database on the AF/TEP page of the Air Force Portal (**https://www.my.af.mil/gcss-af/USAF/ep/contentView.do?contentType=EDITORIAL&contentId=cA4057E1F3C49EABC013C8CEA6BD714C5&channelPageId=s6925EC1351550FB5E044080020E329A9&programId=t88B4F00B39C57917013A794B7A081E45**) provides information about the capabilities of available Air Force test facilities, capabilities, and other resources.

4.15.1. Use of Government Test Facilities. The Integrated Test Team will plan to take full advantage of existing investments in DoD ranges, facilities, and other resources, including the use of embedded instrumentation. For Air Force programs, test teams should plan to use Air Force test capabilities first, followed by other Major Range and Test Facility Base facilities, followed by other military Service and non-DoD government facilities (including Federally Funded Research and Development Corporation test resources), and finally contractor facilities. This hierarchy does not mean that all test and evaluation facilities used by a program must be from a single category; combinations of contractor and government facilities may provide the best business case and should be considered.

4.15.2. Use of Non-Government Facilities. During test planning development, the Integrated Test Team should consider contractor test facilities only when government facilities are not available, cannot be modified, or are too expensive. If the strategy for test and evaluation calls for testing at non-government facilities, the Program Manager must conduct a business case analysis that includes facility life cycle sustainment costs for all Courses of Action. Analyze Courses of Action that include teaming arrangements with other programs using the same facilities on a cost-sharing basis. Include these facility requirements in the Engineering and Manufacturing Development Request For Proposal and document the final choice with rationale in the Test and Evaluation Master Plan. The test and evaluation resource strategy must be cost-efficient as well as flexible while also providing consideration for security of the asset(s).

4.15.2. **(AFMC)** Use of Non-Government Facilities. A program desiring testing at non-DoD Test Ranges/Facilities must ensure it is in the Government's best interests and the business case analysis is reviewed by AFMC/A3/6. **(T-2)**.

4.15.3. Use of Exercises and Experiments. To the maximum practical extent, the USAFWC assists Air Force test organizations in gaining access to exercises and experiments to take advantage of operationally realistic environments, high threat densities, massed forces, and other efficiencies. Test organizations should plan to participate in joint and Service experiments and war games, as appropriate. The goals of the exercise, experiment, or test and evaluation activity must be compatible; some tailoring may be required to ensure all stakeholders benefit from the activity.

4.15.4. Planning for Testing in a Joint Environment. All planning for testing must be structured to reflect the joint environment and missions in which the system will operate.

4.15.5. Planning for Target and Instrumented Munitions Expenditures. Test organizations, in consultation with Program Managers, will plan for aerial target requirements in accordance with AFMAN 99-108, *Programming and Reporting Aerial Target and Missile Expenditures in Test and Evaluation*. Test organizations and Program Managers must forecast their requirements for munitions flight termination and telemetry kits in accordance with AFI 99-120, *Forecasting and Programming Munitions Telemetry and Flight Termination Systems*.

4.15.6. Planning for Cyber Test Resources. Cyber test assets needed to support testing must be included in the first Test and Evaluation Master Plan of a program and updated in subsequent Test and Evaluation Master Plans. Resource requirements must reflect use of operationally representative test articles in an operationally representative cyber environment.

4.15.7. Planning for Foreign Materiel Resources. Integrated Test Team members should consult with requirements, acquisition, and intelligence organizations to determine the need for foreign materiel resources.

4.16. Testing Defense Business Systems. The Defense Business Systems acquisition approach is outlined in DoDI 5000.75 and implemented by AFMAN 63-144. The Defense Business Systems approach follows a Business Capability Acquisition Cycle that encourages tailored procedures for capability being acquired and application of commercial best practices.

4.16.1. The Business Capability Acquisition Cycle replaces traditional acquisition milestones A, B and C with phase-specific Authority-To-Proceed decision points. For Limited and Full Deployment Authority-To-Proceeds, the Milestone Decision Authority, in conjunction with the functional sponsor, require both developmental and operational test results prior to deployment.

4.16.2. Business Capability Acquisition Cycle utilizes a Capability Implementation Plan which captures Developmental Test and Operational Test requirements traditionally codified in a Test and Evaluation Master Plan. The Capability Implementation Plan also contains a Developmental Evaluation Framework matrix. The Developmental Evaluation Framework serves as a test and evaluation roadmap and is used to support sound acquisition program decision making and shows the correlation/mapping between test events, key resources, capability requirements, and the decision supported. **Note**: For Defense Business Systems programs on the OSD/DOT&E oversight list, a stand-alone Test and Evaluation Master Plan and Concept of Operations are still required.

4.16.3. Defense Business Systems programs maximize the effective use of integrated testing and automated software test tools. Integrated testing may include all types of test activities such as: modeling and simulation, cyber testing, contractor testing, developmental and operational testing (combined where practical), interoperability testing, and certification. When supported by an appropriate risk analysis, assessments may use data from integrated test events other than dedicated independent operational test events.

4.16.4. Defense Business Systems interoperability test and evaluation will include testing with actual representations of interface systems in a controlled representative environment and assess interoperability between business systems in different functional areas (including systems currently in sustainment).

4.16.5. Defense Business Systems programs including limited deployments or software releases will require Operational Test and Evaluation readiness certification per AFMAN 63-

119, followed by Operational Test and Evaluation. The Program Manager must ensure that any specialized tests (e.g., cyber and interoperability), and correction of any deficiencies with mission impacts, are addressed as early as possible prior to cyber and interoperability certification decision milestone dates. Once fielded, cybersecurity capability will be monitored using an Authorizing Official-approved system-level continuous monitoring strategy.

4.17. Testing of Urgent Needs. Expedited testing and reporting are required for urgent needs (e.g., Urgent Operational Need, Joint Emergent Operational Need, or Joint Urgent Operational Need) using the Quick Reaction Capability guidance in CJCSI 5123.01H (and the associated Joint Capabilities Integration and Development System Manual) and the AF/A5R Requirements Development Guidebook, Volume 2 (Urgent Needs) along with the acquisition guidance in DoDD 5000.71, *Rapid Fulfillment of Combatant Commander Urgent Operational Needs*, and DoDI 5000.02. Levels of risk acceptance will be higher and timelines much shorter than normal in order to satisfy urgent needs. Tailoring and streamlining are required for rapid acquisition programs. The document requirement is the minimal amount necessary to define and execute the program. A Test and Evaluation Master Plan may be waived for accelerated or urgent programs on DOT&E oversight; the Program Manager should prepare an operational and/or live fire test plan for DOT&E approval. Test and evaluation results are generally reported with a Capabilities and Limitations Report according to **Paragraph 7.5**. After initial system fielding, if the Quick Reaction Capability will be further developed as an enduring program, the Program Executive Officer may require the program to complete the traditional acquisition, requirements, test and evaluation, and certification and accreditation processes for any unfinished areas. For urgent need systems being added to existing capability, testing must ensure that the addition did no harm to the existing system, including cybersecurity.

4.18. Additional Early Planning Considerations. Program Managers and test and evaluation practitioners need to consider the topics in **Table 4.1** prior to Milestone A. Although details are not required until after Milestone A, early strategic planning for these items streamlines later activities. The Integrated Test Team should locate qualified personnel to develop and manage these future topics. **Chapter 5** contains the details.

Table 4.1. Topics for Early Test Planning Consideration.

Topic	Description	For More Information
Common Test and Evaluation Database	Single repository for all test and evaluation data for the system under test. **Note:** official government deficiency reports must be input into the Joint Deficiency Reporting System.	Para 5.18
Critical Technical Parameters	Measurable, critical system characteristics that, when achieved, allow the attainment of operational performance requirements.	Para 5.11
Data Archiving	Retention of test plans, analyses, annexes and related studies to maintain historical perspective	Para 5.18.9

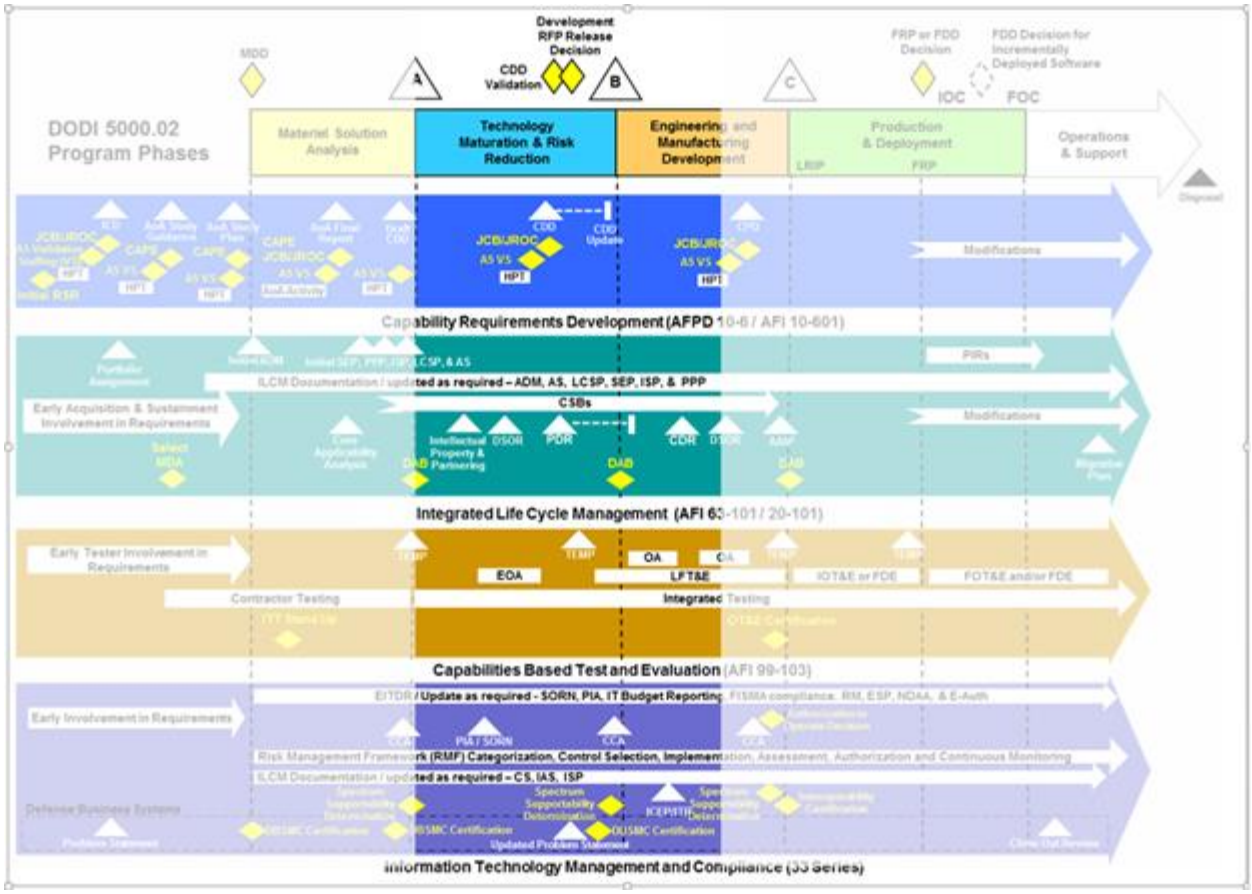
Deficiency Reporting	Processes and procedures established by the Program Manager to report, screen, validate, evaluate, track, prioritize, and resolve deficiencies	Para 5.19
Foreign Disclosure	Recommending test data or materials for release to foreign nationals	Para 5.18.8
Integrated Technical and Safety Reviews	Procedures for scheduling and conducting technical and safety reviews	Para 5.21
Joint Reliability and Maintainability Evaluation Team	Collects, analyzes, verifies, categorizes, and scores reliability, availability, and maintainability data	Para 5.18.5
Scientific Test and Analysis Techniques	Scientifically-based test and analysis techniques and methodologies for designing, executing, and reporting on tests	Para 5.13

Chapter 5

TEST AND EVALUATION ACTIVITIES SUPPORTING MILESTONE B DECISIONS

5.1. Post Milestone A. The most important activities after the Milestone A decision and during the Technology Maturation and Risk Reduction phase are shown in **Figure 5.1**. Sustained, high quality tester involvement and collaboration with requirements sponsors and system developers must continue throughout the Technology Maturation and Risk Reduction phase in preparation for the next phase, Engineering and Manufacturing Development. Test and Evaluation practitioners continue expanding and developing the topics described in **Chapter 4**. They must address new topics added in this chapter, continue refining the strategy for test and evaluation, and begin building specific, executable test and evaluation plans that support the requirements, acquisition, and cyber test.

Figure 5.1. Integration of Requirements, Acquisition, and Test and Evaluation Events Prior to Milestone B.



5.2. Test and Evaluation Funding Sources. The funding sources for test and evaluation depend on the nature and purpose of the work and the type of testing. Funding is not based on the organization conducting the test or the name of the test. Detailed guidance is in AFI 63-101_20-101, and AFMAN 65-605V1. Funding requirements for Joint Interoperability Certification Tests must be coordinated directly with JITC in accordance with the JITC Interoperability Process Guide v2.0 and AFI 63-101_20-201. Test resource advisors must ensure compliance with these

documents before requesting and committing funds. Direct assistance is available from SAF/FMBI, SAF/AQXR, and AF/TEP.

5.3. Formal Contractual Documents. The Chief Developmental Tester working with developmental testers review the System Requirements Document to ensure it correctly links and translates the Capability Development Document (draft or final, as appropriate) into system specifications that can be put on contract. For guidance, use DD(DTE&P)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts.* The Integrated Test Team reviews the Contract Data Requirements List to ensure it describes the content, format, delivery instructions, and approval and acceptance criteria for all deliverable test and evaluation data. The Integrated Test Team confirms that sufficient funding is provided for all test and evaluation-related resources. The Integrated Test Team also reviews these drafts to ensure user-defined capabilities have been accurately translated into system specifications and provisions are made for the following:

5.3.1. Government review and approval of contractor test plans and procedures before tests commence.

5.3.2. Memorandum of Agreement drafted, if necessary, to delineate specific developmental test responsibilities assigned to the contractor and the government (i.e., Lead Developmental Test and Evaluation Organization).

5.3.3. Government insight into contractor testing to ensure systems are maturing as planned, to include government observation of contractor testing.

5.3.4. Proper interface of the contractor's Deficiency Report system with the government's Deficiency Report system, including TO 00-35D-54, compliant processes and methodologies, and portability of data into government information management systems.

5.3.5. Contractor test and evaluation support such as failure analyses, test and evaluation data collection data sharing and data management, operation of unique test equipment, provision of product support, and test reports.

5.3.6. Contractor participation in government test planning forums such as the Integrated Test Team.

5.3.7. Contractor provision of training to testers and provision of long-lead items as well as contractor support of instrumentation necessary to collect data needed by other stakeholders.

5.4. Limitations on Contractor Involvement in Operational Testing. There are limits on contractor involvement in Initial Operational Test and Evaluation of Major Defense Acquisition Programs, such as in 10 U.S.C. § 2399 and DoDI 5000.02. Air Force policy applies these limitations to all Operational Test and Evaluation programs, projects, and activities regardless of Acquisition Category. This does not prohibit contractor observation of Operational Test and Evaluation events if the program office provides justification to the Operational Test Organization or Operational Test Agency for approval and it does not influence the event.

5.4.1. System Contractors. Operational testers must strictly avoid situations where system contractors could reduce the credibility of operational test results or compromise the realistic accomplishment of operational test scenarios. Contractor personnel may only participate in Operational Test and Evaluation of Air Force programs to the extent they are planned to be

involved in the operation, maintenance, and other support of the system when deployed in combat.

5.4.2. System Contractor Support to Operational Testing. System contractors may be beneficial in providing logistic support and training, test failure analyses, test data, and unique software and instrumentation support that could increase the value of operational test data. Explanations of how this contractor support will be used and the mitigation of possible adverse effects must be described within the Test and Evaluation Master Plan, as well as in developmental and operational test plans.

5.4.3. Contractors. Contractors who have been involved in the development, production, or testing of a system may not be involved in the establishment of criteria for data collection, performance assessment, or evaluation activities for operational testing. This limitation does not apply to a support contractor that has participated in such development, production, or testing solely on behalf of the government.

5.5. Testing Information Technology and Defense Business Systems. As agile software development concepts and methods are incorporated into DoD policy, the Integrated Test Team must tailor the test and evaluation strategy to suit program needs. If an agile development technique is selected, a tailored test approach must be harmonized accordingly. While efforts should be made to synchronize developmental and operational testing throughout development, no formal operational testing should be performed until a deployable release or increment will deliver a usable capability (including affecting other operational systems) in the operational environment. For programs employing agile software development, refer to **Paragraph 3.9.3**.

5.5.1. The Integrated Test Team ensures cyber testing described in **Paragraph 3.9.2** is integrated into the Information Support Plan, System Engineering Plans, Test and Evaluation Master Plan or Capabilities Implementation Plan for Defense Business Systems, contracts, and relevant test plans, where and when appropriate.

5.5.2. The Integrated Test Team should accomplish risk analysis in accordance with DoDI 5000.75 and AFMAN 63-144.

5.6. Modeling and Simulation in Support of Test and Evaluation. Increasingly complex battlespace environments, cross-domain systems interdependencies, and increasingly capable and dynamic threats are effectively making modeling and simulation essential in developing, testing, and assessing system capability and performance. Early requirements definition, research, and detailed planning are essential in ensuring that modeling efforts are timely, adequately resourced and fully address programmatic needs.

5.6.1. Test and evaluation planning for modeling and simulation needs to look across the full breadth of the program to avoid duplication, identify and leverage synergies, and to ensure that long lead requirements such as intelligence community support are identified and resourced in a timely fashion and will meet schedule requirements.

5.6.1.1. Additional modeling and simulation direction, guidance, and resources are available across the Department and the Services and should be reviewed for applicability. The DoD Modeling and Simulation Coordination Office, **https://www.msco.mil/**, provides a code repository and tools for modeling and simulation discovery metadata search to identify existing verified, validated, accredited, and reusable modeling and simulation tools and Digital System Models prior to initiating development of modeling

and simulation assets. This review reduces duplication of existing technology and products. Use of a models or simulations in support of an operational evaluation must be accredited by the Operational Test Agency.

5.6.1.2. For programs under DOT&E Oversight, the use of modeling and simulation for Operational Test and Evaluation must be approved by DOT&E. Additional guidelines can be found in the AF/TE Test and Evaluation Master Plan Guide at **https://haf-te.sharepoint.afncr.af.mil/SitePages/Home.aspx** and the DOT&E Test and Evaluation Master Plan Guidebook at **http://www.dote.osd.mil/tempguide/index.html**. It should be noted that accreditation of a modeling and simulation application for one program does not mean accreditation is valid for use on another program. Modeling and simulation tools must also undergo cyber testing to identify cyber vulnerabilities and to prevent or mitigate cyber threats prior to use in test of other systems.

5.6.2. The Program Manager must document how modeling and simulation supports testing in the Modeling and Simulation Support Plan and the Test and Evaluation Master Plan to include schedule planning for verification, validation, and accreditation completion prior to formal requirement verification. For additional policies on using modeling and simulation, refer to AFI 63-101_20-101, AFI 16-1001, *Verification, Validation and Accreditation (VV&A)*, and AFI 16-1005.

5.7. Pre-Milestone B Developmental Test and Evaluation Planning.

5.7.1. Planning for Integrated Testing. Integrated testing, as described in **Paragraph 1.3.4**, is the expected approach unless it can be shown that it adds unacceptable costs, delays, or technical risks. An integrated test strategy integrates operationally relevant test events throughout Developmental Test and Evaluation to provide additional test realism, decrease overall duplication of effort, increase test efficiency, and identify performance shortfalls that could result in increased development costs. Multiple sets of test objectives must be accomplished together within statutory and regulatory guidelines. Developmental Test and Evaluation activities can overlap and share test and evaluation resources with Operational Assessments to conserve resources and extract maximum amounts of data.

5.7.1.1. Use the systems engineering approach in the System Engineering Plans to break down, identify, and integrate the critical operational issues, critical technical parameters, test objectives, measures of effectiveness, measures of suitability, measures of performance, resources, and schedules. When appropriate, scientific test and analysis techniques and methodologies (as described in **Paragraph 5.13**) will also be used. Safety review processes will not be compromised. See **Paragraph 1.3** and **Paragraph 6.2** through **Paragraph 6.4**

5.7.1.2. Test approaches must be flexible and efficient, especially in areas long held to require rigid structural control. Traditional limits such as frozen baselines for the duration of Operational Test and Evaluation, concurrent development, data merging, using other testers' validated data, and statistical confidence when using small sample sizes should be carefully reviewed so they do not become impediments. However, the overarching goals of any test should not be compromised. After thorough analysis, test planners may conclude that some test activities (e.g., the dedicated portions of Operational Test and Evaluation) should not be combined.

5.7.1.3. While planning for integrated testing, both operational suitability and operational effectiveness should be given commensurate consideration. See AFPAM 63-128, **Attachment 6**, and *DoD Guide for Achieving Reliability, Availability, and Maintainability*.

5.7.1.4. Any test limitations or deferrals resulting from integrating test events must be explained in test plans and the Test and Evaluation Master Plan. See **Paragraph 5.22**.

5.7.1.5. Update the Test and Evaluation Master Plan and operational test plans prior to each milestone with the latest validated threat assessment. Any elevated classification resulting from inclusion of threat information will require addition of classified annex to Test and Evaluation Master Plan and/or classified requirements document.

5.7.2. Requesting Operational MAJCOM Support for Developmental Test and Evaluation. Requests for operational MAJCOM test support for Developmental Test and Evaluation must be vetted through the appropriate MAJCOM headquarters test and evaluation office before they may be accepted. Operational and/or implementing MAJCOM headquarters' review and approval is required depending on the nature of the request.

5.7.2.1. Air Force program offices and/or developmental test organizations may request operational MAJCOM (i.e., non-test coded unit) support for Developmental Test and Evaluation activities only after obtaining concurrence from that organization's MAJCOM headquarters test and evaluation office. Such test support will be restricted to low-risk military utility evaluations under the direct supervision of a Lead Developmental Test and Evaluation Organization. These activities will be called "Developmental Test and Evaluation Assists" to indicate they are not operational testing.

5.7.2.2. Air Force program offices and developmental test organizations may request MAJCOM Operational Test Organization support for Developmental Test and Evaluation activities (including acquisition/sustainment programs or proof-of-concept activities where no formal Developmental Test and Evaluation is planned) only after obtaining concurrence from the operational MAJCOM headquarters test and evaluation office. Such test support should normally be restricted to low-risk (technical and safety) Developmental Test and Evaluation activities. Operational Test Organizations must accomplish independent technical and safety reviews. Any previously accomplished technical and safety reviews and approval documentation will be provided to the Operational Test Organization for their independent analysis. Document the accomplishment of Operational Test Organization independent technical and safety reviews as an attachment to the requesting agency's technical and safety review.

5.7.2.3. Requests for operational MAJCOM test support from non-Air Force organizations (e.g., Defense Advanced Research Projects Agency) must first be forwarded to the operational MAJCOM headquarters test and evaluation office for feasibility review and approval. Requests rejected by an operational MAJCOM may be submitted to an implementing MAJCOM headquarters test and evaluation office (AFMC/A3 or AFSPC/TE as appropriate) for potential sponsorship, program initiation and subsequent assignment of a Lead Developmental Test and Evaluation Organization. If a program office or Lead Developmental Test and Evaluation Organization is associated with the non-Air Force agency request, forward all applicable technical and safety data to the Operational Test Organization for their independent reviews.

5.7.2.4. Information on test resources and ranges can be found in the AF/TE Guidebook.

5.8. Live Fire Test and Evaluation Planning. The following Paragraphs supplement statutory direction in 10 USC § 2366 and guidance in AFI 63-101_20-101. The *Defense Acquisition Guidebook* provides additional guidance for implementing Live Fire Test and Evaluation legislation and OSD requirements.

5.8.1. Implementation. Live Fire Test and Evaluation results must support system design and production decisions for covered systems. The focus and funding for Live Fire Test and Evaluation should be on the system components immediately related to the development or modification program, but the resultant evaluation must be at the system level. The Chief Developmental Tester should contact the appropriate Live Fire Test and Evaluation organization for assistance with Live Fire Test and Evaluation planning, test asset provisioning, test execution, data analysis, and reporting including strategies, waivers, alternative plans, test/analysis plans, and reports. The appropriate Live Fire Test and Evaluation organizations are: (1) munitions (lethality) covered systems - 96th Test Wing, 96th Operating Group, 780th Test Squadron; and (2) aircraft survivability covered systems - Arnold Engineering Development Complex, 704th Test Group, Aerospace Survivability and Safety Office (704th Test Group/OL-AC).

5.8.2. Determining Covered System or Major Munitions Program Status. The Program Manager and Integrated Test Team must first determine if their system is a "covered system," "major munitions program," or "covered product improvement program." Program Executive Officers must continually review their portfolios for any programs "covered". When a potential Live Fire Test and Evaluation candidate is identified, the Integrated Test Team, Program Manager, appropriate Live Fire Test and Evaluation organization, and AF/TEP must be notified as early as possible to start the Live Fire Test and Evaluation Strategy Approval process. The appropriate Live Fire Test and Evaluation organization can facilitate discussions to help determine a corporate Air Force position and develop a recommendation to DOT&E.

5.8.3. Live Fire Test and Evaluation Strategy Approval. As soon as an affirmative determination of covered status is made, the Chief Developmental Tester develops a Live Fire Test and Evaluation strategy with the assistance of the appropriate Live Fire Test and Evaluation organization. The Program Manager is responsible for communicating and coordinating the Live Fire Test and Evaluation strategy with DOT&E and determining the appropriate method. The strategy must be structured so design deficiencies uncovered during Engineering and Manufacturing Development may be corrected before proceeding beyond Low-Rate Initial Production. Technology projects meeting the statutory criteria are also required to undergo Live Fire Test and Evaluation. The Integrated Test Team describes the Live Fire Test and Evaluation strategy and plans in the Test and Evaluation Master Plan. Live Fire Test and Evaluation must be fully integrated into the continuum of testing. AF/TE will coordinate the Live Fire Test and Evaluation strategy with SAF/AQ before it is forwarded to DOT&E for final approval.

5.8.4. Requests for Live Fire Test and Evaluation Waivers. The Secretary of Defense may waive the application of the survivability and lethality tests of this section to a covered system, munitions program, missile program, or covered product improvement program if the Secretary determines that live-fire testing of such system or program would be "unreasonably expensive and impractical" and submits a certification of that determination to Congress either

(a) before Milestone B approval for the system or program; or (b) in the case of a system or program initiated at (i) Milestone B, as soon as is practicable after the Milestone B approval; or (ii) Milestone C, as soon as is practicable after the Milestone C approval. To support this determination, the Program Manager will submit the Live Fire Test and Evaluation waiver request and alternative strategy to AF/TE and SAF/AQ prior to Service-level approval. After SAF/AQ approval, the Live Fire Test and Evaluation waiver request and alternative strategy are forwarded to DOT&E for alternative strategy approval, and then together to USD(R&E) for waiver approval. Upon final OSD approval, DOT&E issues a report and formal certification to Congress. Document the Live Fire Test and Evaluation waiver and alternative Live Fire Test and Evaluation strategy in an annex to the Test and Evaluation Master Plan.

5.8.5. Alternative Live Fire Test and Evaluation Strategy. The alternative strategy does not alleviate the statutory requirement for survivability or lethality testing. The alternative strategy must include Live Fire Test and Evaluation of components, subassemblies, and/or subsystems which, when combined with accredited modeling and simulation and combat data analysis, will result in confidence in the survivability (or lethality) of the system.

5.8.6. Alternative Strategy and Testing for Major Modifications. In the case of major modifications or new production variants, the alternative Live Fire Test and Evaluation strategy and detailed plans must focus on configuration changes that could significantly affect survivability or lethality. Potential interactions between portions of the configuration that are changed and those that are not changed must be assessed. The assessment results must include a whole system analysis of the survivability and vulnerability impacts on the total system. Alternative Live Fire Test and Evaluation are not required on components or subsystems unrelated to the modification program.

5.8.7. Detailed Live Fire Test and Evaluation Plans. DOT&E reviews and approves all Live Fire Test and Evaluation plans prior to commencement of Live Fire Test and Evaluation. All Live Fire Test and Evaluation must be completed and test reports submitted 45 calendar days before the Beyond-Low-Rate Initial Production decision review. The *Defense Acquisition Guidebook* lists the mandatory contents of Live Fire Test and Evaluation plans.

5.8.8. Personnel Survivability. An assessment of force protection equipment and personnel survivability must be conducted.

5.9. Early Operational Assessment Planning and Execution. During the Technology Maturation and Risk Reduction phase, Early Operational Assessments are conducted as required to provide operational inputs to requirements and system developers prior to Milestone B. The Early Operational Assessment supports development of the Capability Development Document, test concepts and plans, the Request for Proposal Release Decision Point, and the Milestone B decision. The scope and content of Early Operational Assessments should be tailored to ascertain if the program is on track using any available data. For programs on DOT&E oversight, Early Operational Assessments will require DOT&E approval before they can start. Early Operational Assessments can be collaborative efforts conducted concurrently with Developmental Test and Evaluation, and need not be independently conducted; however, results must be independently assessed.

5.10. Tester Involvement in Requirements Documentation. Testers must continue assisting requirements sponsors in refining capability requirements and enabling and operating concepts as described in the AF/A5R Requirements Development Guidebook, Volume 1. Developmental and

operational testers participate in High Performance Teams by providing technical and operational expertise, lessons learned, and data from Early Operational Assessments, prototypes, and integrated testing. Testers help ensure system performance attributes (Key Performance Parameters, Key System Attributes, and Additional Performance Attributes) and Critical Technical Parameters are attainable, testable, and accurately expressed in System Requirement Documents, Requests for Proposal, and Statements of Work.

5.11. Critical Technical Parameters and Key Performance Parameters. The Chief Developmental Tester and the systems engineers, assisted by Developmental Test and Evaluation practitioners, are responsible for developing Critical Technical Parameters. Critical Technical Parameters are measurable, critical system characteristics that, when achieved, allow the attainment of operational performance requirements. They are selected from the technical performance measures on the critical path to achieving the system's technical goals. Failure to achieve a Critical Technical Parameters during Developmental Test and Evaluation should be considered a reliable indicator that the system is behind in the planned development schedule, or will likely not achieve an operational requirement. By contrast, a Key Performance Parameter is a system attribute considered essential for mission accomplishment. Key Performance Parameters are expressed in term of parameters which reflect Measures of Performance using a threshold/objective format.

5.11.1. Developmental testers must help ensure Critical Technical Parameters are measurable and testable, traceable to key system requirements and architectures, and help the Program Manager translate them into system specifications for contractual purposes.

5.11.2. Critical Technical Parameters must reflect the system's definition and design for all elements such as hardware components, software, architectures, information assurance, personnel, facilities, support equipment, reliability and maintainability, and data. Critical Technical Parameters will be correlated to Critical Operational Issues and Operational Test and Evaluation test objectives (i.e., Measures of Effectiveness and Measures of Suitability) in the Test and Evaluation Master Plan. Testers must ensure complete coverage and correlation by listing them in the Developmental Evaluation Framework and or Operational Evaluation Framework in the Test and Evaluation Master Plan. Guidance and examples for the Developmental Evaluation Framework can be found in the *Defense Acquisition Guidebook*.

5.12. Testing commercially available off-the-shelf items, Non-Developmental Items, and government-furnished equipment. Chief Developmental Testers shall plan for and conduct test and evaluation of commercially available off-the-shelf items, Non-Developmental Items, and government-furnished equipment even when these items come from pre-established sources. The operational effectiveness and suitability of these items and any military-unique applications must be tested and evaluated before a Full-Rate Production or Full Deployment decision. For Section 804 programs and experiments, test must be accomplished to evaluate the required operational capability and suitability for use and operation in the intended operational environment. The Integrated Test Team should plan to take maximum advantage of pre-existing test and evaluation data to reduce the scope and cost of government testing. More information is available in handbook SD-2, *DoD Acquisitions Buying Commercial and Nondevelopmental Items*. Information technology and national security systems should be tested in accordance with AFI 63-101_20-101, and the *DoD Joint Special Access Program Implementation Guide*, if applicable.

5.13. Scientific Test and Analysis Techniques. Whenever feasible and consistent with available resources, scientific test and analysis techniques will be used for designing and executing tests (Developmental Test and Operational Test), and for analyzing the subsequent test data. The top-level approach must be described in the System Engineering Plan at Milestone A, and in more detail in subsequent test plans as appropriate. The conceptual test designs themselves need not be part of the Test and Evaluation Master Plan or the System Engineering Plans, but shall be available for review during coordination of those documents. The Integrated Test Team should consult a scientific test and analysis techniques practitioner (systems engineer experienced in applying scientific test and analysis techniques methodologies to optimize test) whenever test designs are considered.

5.13.1. The selected approach must address the following areas at a minimum:

5.13.1.1. Define the objective(s) of the test (or series of tests, when appropriate).

5.13.1.2. Identify the information required from the test to meet the test objective(s).

5.13.1.3. Identify the important variables that must be measured to obtain the data required for analysis. Identify how those variables will be measured and controlled. Identify the analysis technique(s) to be used.

5.13.1.4. Identify the test points required and justify their placement in the test space to maximize the information obtained from the test.

5.13.1.5. If using a traditional hypothesis test for data analysis, calculate statistical measures of merit (power and confidence level) for the relevant response variables for the selected number of test events. If using another statistical analysis technique, indicate what statistical measures of merit will be used. If a statistical analysis technique is not being used, discuss the analysis technique that is being used and provide rationale.

5.13.1.6. State whether sampling error is expected, and identify the plan to deal with sampling error in the measurements' uncertainty and its inclusion in the overall uncertainty of derived parameters.

5.13.2. The selected test design(s) should help ensure smoother, more efficient integration of all types of testing up to and including Follow-on Operational Test and Evaluation. The Program Manager and the Operational Test Organization are responsible for the adequacy of the planned series of tests and reports on the expected decision risk remaining after test completion.

5.14. Cyber Test. All aspects of cyber test including required resources, manpower, and infrastructure must be planned for and briefly described in the Test and Evaluation Master Plan. Cyber-related Test and Evaluation Master Plan requirements should support cyber test considerations in **Paragraph 3.9.2**. Test and Evaluation Master Plans should briefly explain what will be accomplished, including scope and expected outcomes for cybersecurity and cyber resilience testing.

5.14.1. Planned testing should explain the scope of "prevent, mitigate, and recover" activities that will be performed during cyber test. It is understood that many system and subsystem architectures were established without cybersecurity and cyber resiliency requirements. The Cybersecurity Strategy should acknowledge these system limitations and explain those aspects of cybersecurity and cyber resiliency that can be tested. For some weapon systems, any

cybersecurity vulnerability is SECRET, at a minimum; thus, classification of this data is pertinent to handling and reporting procedures. The security classification of known or discovered cybersecurity vulnerabilities should be conveyed to the test organization prior to testing and documented in the Cybersecurity Strategy. Create a classified annex if needed.

5.14.2. The Chief Developmental Tester, Lead Developmental Test and Evaluation Organization, Operational Test Organization, or Operational Test Agency with cooperation from the prime contractor, will analyze the system under test design and security implementation throughout the acquisition life cycle. Cyber vulnerabilities are not exclusively defined by the Risk Management Framework process. Subject matter experts will analyze and test the attack surface to identify issues related to cybersecurity and resilience of military capabilities from cyber attack. The Cybersecurity Strategy should convey which portions of the potential attack surface are being assessed during Developmental Test and Operational Test. The Cybersecurity Strategy should provide the plan to assess user ability to prevent a cyber attack and to mitigate the threat activity and mission capability after degradation or loss. Security classification of vulnerabilities must be determined and documented in the Test and Evaluation Master Plan.

5.15. Request for Proposal Test and Evaluation Master Plan. The Milestone A Test and Evaluation Master Plan must be updated prior to release of the request for proposal. The Test and Evaluation Master Plan must reflect a test program commensurate with system requirements. The Request for Proposal Test and Evaluation Master Plan should also include a user-provided Concept of Operations. The Director AF/TE will sign Request for Proposal Test and Evaluation Master Plans for all programs on DOT&E oversight. If the program enters post-Milestone A, a Request for Proposal Test and Evaluation Master Plan must be created and staffed for AF/TE signature.

5.16. Milestone B Test and Evaluation Master Plan. At Milestone B the Test and Evaluation Master Plan must be updated to reflect revised test and evaluation strategy developed in Milestone A and any changes to required resources or schedule.

5.16.1. A Developmental Evaluation Framework will be submitted with the Milestone B Test and Evaluation Master Plan. The Developmental Evaluation Framework identifies key areas to assess progress toward achieving Key Performance Parameters, Critical Technical Parameters, Key System Attributes, interoperability requirements, cybersecurity and cyber resiliency requirements, reliability growth, maintainability attributes, Developmental Test objectives, and others as needed. The Developmental Evaluation Framework also correlates test events, resources, and decision supported. See *Defense Acquisition Guidebook* for details.

5.16.2. An Operational Evaluation Framework linking operational test strategy, test events, independent variables, and test resources (traceable to test events) to ensure a robust approach in evaluating mission capability.

5.17. Tailored Integrated Documentation. AFI 63-101_20-101 and AFPAM 63-128 encourage the Program Manager to tailor, combine, and streamline program documentation to meet program needs as long as specified document content, formats, and templates are followed. The Air Force tailoring concept permits consolidation of multiple documents (e.g., the Acquisition Strategy and acquisition plan, Test and Evaluation Master Plan, and System Engineering Plan) into fewer documents, perhaps a single document if justifiable. The Milestone Decision Authority retains the authority to tailor and make the final determination of what information is covered.

5.18. Management of Test and Evaluation Data. Accurate and efficient data collection is essential in all test and evaluation efforts and must be planned before any testing starts. Integrated testing requires use of common test parameters across test boundaries for uniform data collection, scoring, analysis, and reporting purposes. Testers must have a clear understanding of their actual data needs and the required instrumentation to collect the data because data collection can be a major expense. Program Managers and testers must safeguard classified information resulting from system development or test such as vulnerabilities identified through cyber test. This includes safeguarding physical and digital data as well as communications and datalinks even when shared or provided to other organizations.

5.18.1. Common Test and Evaluation Data Management. The Chief Developmental Tester will establish a common test and evaluation database as early as practical for all test and evaluation data for the system under test. The goal is to leverage all available test and evaluation knowledge about the system. A statement about data validity and a point of contact must be attached to each data batch. All program stakeholders will have access to test and evaluation data on a need-to-know basis. Classified, proprietary, competition sensitive, and government-only data require restricted access. The Integrated Test Team will ensure that any request for proposal or statement of work supports inclusion of contractor test and evaluation data as part of this database, as well as all test and evaluation data from previous increments and real-world operations. To the maximum extent possible, all testers must allow open data sharing and non-interference observation by other testers, the system developer, contractor, users, DOT&E, DD(DTE&P), and the Program Manager.

5.18.2. Tracking Test and Evaluation Data. All test teams establish rigorous data collection, control, accountability, and security procedures for test and evaluation data. To avoid using questionable test data, test teams must only use authorized databases for storing data, verify the origin and integrity of any data used in final reports, i.e., whether the data came from contractors, Developmental Test and Evaluation, integrated testing, other Service Operational Test Agencies, deployed assets used in real world operations, or dedicated Air Force operational tests. Test and evaluation data from deployed early prototypes used and evaluated in real world operations should be properly archived. See **Paragraph 5.17**, **Paragraph 5.18**, and **Paragraph 6.10** for more information.

5.18.3. Contractor Test and Evaluation Data. Test teams and Test Integrated Product Teams should use as much contractor test and evaluation data as possible if its accuracy can be verified. Contractor test and evaluation data should be visible and shall be clearly identifiable in the common test and evaluation database.

5.18.4. Operational Testers. Operational testers may use data from sources such as Developmental Test and Evaluation, integrated testing, and Operational Assessments to augment or reduce the scope of dedicated operational testing if the data can be verified as accurate and applicable. DOT&E reviews and approves data sources for programs on Oversight.

5.18.5. Joint Reliability and Maintainability Evaluation Team. The Program Manager will establish a Joint Reliability and Maintainability Evaluation Team (or similar Test Integrated Product Teams) to assist in the reliability growth process and reliability growth planning and the collection, analysis, verification, and categorization of reliability, availability, and maintainability data. Joint Reliability and Maintainability Evaluation Team may also include

Prognostics and Health Management data. Categorizing is defined as assignment of relevancy and chargeability of the data. Scoring is defined as officially accepting Joint Reliability and Maintainability Evaluation Team data as useable for reliability and maintainability calculations. A clear, unequivocal definition of "failure" must be established for the equipment or system in relation to its performance parameters. The Joint Reliability and Maintainability Evaluation Team also reviews applicable Deficiency Reports and recommends whether or not they should be closed. The Program Manager or designated representative chairs the Joint Reliability and Maintainability Evaluation Team during Developmental Test and Evaluation; an operational test representative chairs during dedicated operational testing. **Note**: A Failure Reporting Analysis and Corrective Action report or a Deficiency Review Board can be used for re-categorization of hardware and software deficiencies identified by the Joint Reliability and Maintainability Evaluation Team. See TO 00-35D-54.

5.18.6. Periodic Review of Test Data. The Program Manager and testers describe in the Test and Evaluation Master Plan how they will jointly review test and evaluation data during the system development and sustainment phases. These should be periodic government-only reviews. For programs where AFOTEC is the lead operational tester, a Test Data Scoring Board may also be used.

5.18.7. Timely Release of Test and Evaluation Data. All test teams will release validated test data and factual information as soon as practical to other testers and stakeholders. Preliminary data may also be released, but must be clearly identified as such.

5.18.8. Disclosing Test Data to Foreign Nationals. The Program Manager is responsible for recommending what test data or materials may be disclosed to foreign nationals. Use AFPD 16-2, *Disclosure of Military Information to Foreign Governments and International Organizations.* See **Paragraph 7.9** and **Paragraph 7.10** about the release and protection of test information.

5.18.9. Data Archiving Strategy. The Integrated Test Team must develop a strategy for collecting and archiving key test and evaluation information and data that have significant record value for permanent retention. Consider the system's importance and potential for future inquiries into baseline performance, performance variance, test design, conduct, and how results were determined. Retain baseline performance data, pertinent statistical information, test plans, Test and Evaluation Master Plans, analyses, annexes, and related studies, in addition to final reports, to maintain a complete historical picture.

5.19. Deficiency Reporting Process. All testers must plan for identifying deficiencies and enhancements and submitting Deficiency Reports in accordance with AFI 63-145. All Government testers will use Joint Deficiency Reporting System for weapon systems deficiency reporting as described in TO 00-35D-54 unless a waiver is approved in accordance with that TO. Directions for technical data deficiencies are in TO 00-5-1, *Air Force Technical Order System*. See additional information in **Paragraph 6.8** and **Paragraph 6.10**

5.19.1. Responsible Agent. The Program Manager has overall responsibility for establishing and administering a Deficiency Report process and tailored procedures for reporting, screening, validating, evaluating, tracking, prioritizing, and resolving Deficiency Reports originating from all sources. A waiver must be obtained from AFMC/Logistics, Engineering and Force Protection if the Joint Deficiency Reporting system is not used. If a contractor-based Deficiency Report system is planned as the system of record, the Request for Proposal and

Statement of Work must require the contractor's Deficiency Report system to satisfy the purpose and intent of the TO, provide visibility to MAJCOM Functionals, cross service components, HQ AFMC, and describe how the process will remain under Government cognizance.

5.19.2. When to Start Reporting Deficiency Reports. The Integrated Test Team determines the optimum time to begin submitting Deficiency Reports to the program's Deficiency Report system. The program's Deficiency Report system must be populated in advance of any Operational Test and Evaluation readiness certification or fielding decision to allow the user, Operational Test Organization, and Operational Accepting Authority sufficient time to assess the impact of known deficiencies on system performance. Deficiency Reports should be promptly reported once formal reporting begins; however, a Watch Item tracking system may be used to ensure sufficient data are collected for accurate reporting. The contractor-based Deficiency Report system may suffice for the early stages of development, but the government-based Deficiency Report system must become the primary method of reporting and tracking Deficiency Reports during government-conducted test and evaluation.

5.19.3. Accurate Categorization of Deficiency Reports. When submitting or screening Deficiency Reports, all testers must ensure the Deficiency Report's severity is accurately represented by assigning the proper category as defined in TO 00-35D-54. Government testers must clearly distinguish between Deficiency Reports which cite deficiencies and those which cite enhancements going beyond the scope of the system's operational requirements.

5.19.4. Deficiency Report Tracking and Management. Developmental Test and Evaluation and Operational Test and Evaluation test directors periodically convene a local Deficiency Review Board to review the prioritization, resolution, and tracking of all open Deficiency Reports and Watch Items. The Developmental Test and Evaluation test director chairs the Deficiency Review Board during Developmental Test and Evaluation phases, and the Operational Test and Evaluation test director chairs the Deficiency Review Board during Operational Test and Evaluation phases. Both test directors, plus representatives from the Participating Test Organizations and using MAJCOMs are members of the Program Manager's Materiel Improvement Project Review Board which provides final resolution of all Deficiency Reports. The Integrated Test Team periodically convenes a Joint Reliability and Maintainability Evaluation Team to review Deficiency Reports focused on reliability, maintainability, and availability.

5.19.5. Prioritizing Deficiency Reports. Prioritized Deficiency Reports are used in preparation for certification of readiness for dedicated operational testing. If the Program Manager cannot correct or resolve all Category I and II Deficiency Reports before dedicated operational testing begins, or defers fixes for these Deficiency Reports, operational testers and users must assess the impacts. The Program Manager and Integrated Test Team must reach agreement prior to certification of readiness for operational testing and develop a plan for resolution and subsequent testing.

5.19.6. Classified Deficiency Reports. Since the Joint Deficiency Reporting System lacks capability to handle classified Deficiency Reports, an alternative Deficiency Report system may be necessary. The Program Manager will establish and maintain procedures to manage classified or sensitive Deficiency Reports in accordance with AFI 16-1404, *Air Force Information Security Program*. Coordinate with the applicable program office representative

before handling. Produce, handle, store, transmit and destroy classified documents according to the applicable program security classification guide.

5.20. Deficiency Reporting for Cyber Vulnerabilities. When addressing cyber vulnerabilities for systems, use the impact codes and severity categories in DoDI 8510.01, *Risk Management Framework (RMF) for DoD Information Technology (IT)*. Severity categories expressed as category I, category II, and category III indicate the risk level associated with each security weakness and the urgency of completing corrective action. Severity categories are assigned after considering the architecture limitations and mitigation measures that have been implemented within the system design (Residual Risk). Mission critical components containing exploitable cyber vulnerabilities should receive priority in remediation or mitigation regardless of severity category. Deficiencies discovered during cyber test should be marked and handled according to the security classification of the data. Also see AFI 63-101_20-101 for details about selecting and implementing security requirements, controls, protection mechanisms, and standards.

5.20.1. AFI 63-101_20-101 assumes vulnerabilities (i.e., deficiencies) will be present and addressed on a continuing basis. These items are maintained in the program Plan of Action and Milestones that supports the Risk Management Framework process. These vulnerabilities are not necessarily reported using the TO 00-35D-54 reporting system.

5.20.2. When assessing cyber vulnerabilities as potential Deficiency Reports, a separate Deficiency Report is not needed for every identified control, shortfall, or finding. Depending on the severity, cyber vulnerabilities should be logically grouped (e.g., protect, detect, react, restore, confidentiality, integrity, or availability). A standard way of reporting vulnerabilities and when they qualify as a Deficiency Report should be developed and described in the Test and Evaluation Master Plan. One way of doing this is described in AFPAM 63-128, **Table A6.8.1**, Software Severity Levels and Weights. Alternatively, use the following documents to assess risk for proper deficiency reporting and vulnerability categorization: Committee on National Security Systems Instruction 1253, *Security Categorization and Control Selection for National Security Systems (CNSSI)*, National Institute of Standards and Technology (NIST) Special Publication (SP) 800-30 rev 1, *Guide for Conducting Risk Assessments*, NIST SP 800-39, *Managing Information Security Risk*, and NIST SP 800-53A rev 4, *Assessing Security and Privacy Controls in Federal Information Systems and Organizations: Building Effective Assessment Plans.*

5.20.3. Cyber vulnerabilities identified during Developmental Test and Evaluation and Operational Test and Evaluation will be reported as observed potential vulnerabilities to the confidentiality, availability, integrity, authentication, and non-repudiation of a system. Some vulnerabilities that rise to the level of a deficiency will equate to materiel solution defects (design and/or documentation) when they demonstrate or have potential for definitive mission impact. Ensure these vulnerabilities are documented, assigned appropriate security classification, vetted, and tracked as a Deficiency Report according to TO 00-35D-54, as well as in the Plan of Actions and Milestones.

5.21. Independent Technical and Safety Reviews. Independent government technical and safety personnel examine the technical and safety aspects of test and evaluation plans that involve government resources prior to commencement of test activities. All test organizations must establish procedures for when and how these reviews are accomplished. These groups function as necessary throughout the acquisition and sustainment process until the system is demilitarized.

5.21. (AFMC) Independent Technical and Safety Reviews. Center Test Authorities, AFTC, and AFRL will develop procedures for conducting reviews for their Center. **(T-2)**. Coordinate with the respective Test Safety Office for Safety Review procedures. The Test Execution Authority will consider the qualifications and experience of personnel executing the test and approve the test to proceed with any residual technical and safety risk IAW AFI 91-202_AFMCSUP. For flight test, ensure Flight Operations Authority approval is granted IAW AFI 11-401_AFMCSUP and as a means to provide flight domain expert review and acceptance of the flight activities to be overseen. **(T-2)**.

5.21.1. Technical Reviews. Technical reviews assess the soundness of system designs and test plans to reduce test risk. Technically qualified personnel with test management experience, but who are independent of the test program, will perform these reviews. At a minimum, technical reviews will assess test requirements, techniques, approaches, and objectives.

5.21.2. Safety Reviews. Safety reviews assess whether the test and evaluation project's safety plan has identified and mitigated all health and safety to include airworthiness risks. Safety review members must be technically qualified and independent of the test program. At a minimum, a trained and qualified Safety Manager will be part of the Safety Review Team. Test organizations will identify risks. All test organizations and test teams will set up procedures for controlling and supervising tests consistent with the risk involved and according to local range safety criteria. These requirements apply to tests, demonstrations, and experiments. In addition, the Program Manager will provide a Safety Release to the Lead Developmental Test and Evaluation Organization or Operational Test Organization prior to any testing involving personnel. The Program Manager will provide airworthiness hazards, risks, and operating restrictions in accordance with AFI 62-601. Mishap accountability and reporting requirements must be clearly established in accordance with AFI 91-204, *Safety Investigations and Reports*, prior to conducting tests.

5.21.3. Nonnuclear Munitions Safety Board. This board reviews and assesses all newly developed live, uncertified munitions, fuses, and initiating devices prior to airborne testing or release in accordance with AFI 91-205, *Nonnuclear Munitions Safety Board*.

5.21.4. Directed Energy Safety Board. This board reviews and certifies all directed energy weapons prior to operational assessment, test and training use in accordance with AFI 91-401, *Directed Energy System Safety*.

5.21.5. **(Added-AFMC)** Substantial Changes to Planned Test Execution. Test organizations will identify when test execution differs substantially from the test plan, determine impact on test risk, modify their test plan, and obtain Test Execution Authority approval prior to execution. **(T-2)**.

5.21.6. **(Added-AFMC)** Test Readiness Review. The readiness review process is conducted before starting test or after an extended break in test activity. The Test Readiness Review will ensure all preparations have been completed and known anomalies have not compromised the execution of the test. All reasonable efforts to minimize risk must be made and verified by the Test Execution Authority. **(T-2)**.

5.22. Test Deferrals, Limitations, and Waivers. A test deferral is the movement of testing and/or evaluation of a specific Critical Technical Parameters, operational requirement, or Critical Operational Issue to a follow-on increment or test activity (e.g., Follow-on Operational Test and

Evaluation). A test limitation is any condition that hampers but does not preclude adequate test and/or evaluation of a Critical Technical Parameters, operational requirement, or Critical Operational Issue during a test and evaluation program. The Integrated Test Team documents test deferrals and test limitations in the Test and Evaluation Master Plan and test plans. Test limitations and test deferrals do not require waivers, but must be described in the Test and Evaluation Master Plan and test plans, to include, in the case of a deferral, a revised timeline for decisions and reports. These test limitations and deferrals are considered approved when the Test and Evaluation Master Plan or test plan is approved. Waivers are the deletion of specific mandatory items; waivers for not conducting Operational Test and Evaluation will not be approved when Operational Test and Evaluation is mandated by statute or this AFI. See **Attachment 1** for definitions and **Paragraph 6.4.3** for more details.

5.22.1. **(Added-AFMC)** For medium- and high-risk test events, non-Test Pilot School graduates may be considered. If non-Test Pilot School graduates are used for medium- and high-risk test events, the rationale must be documented by the Test Execution Authority and Flight Operations Authority.

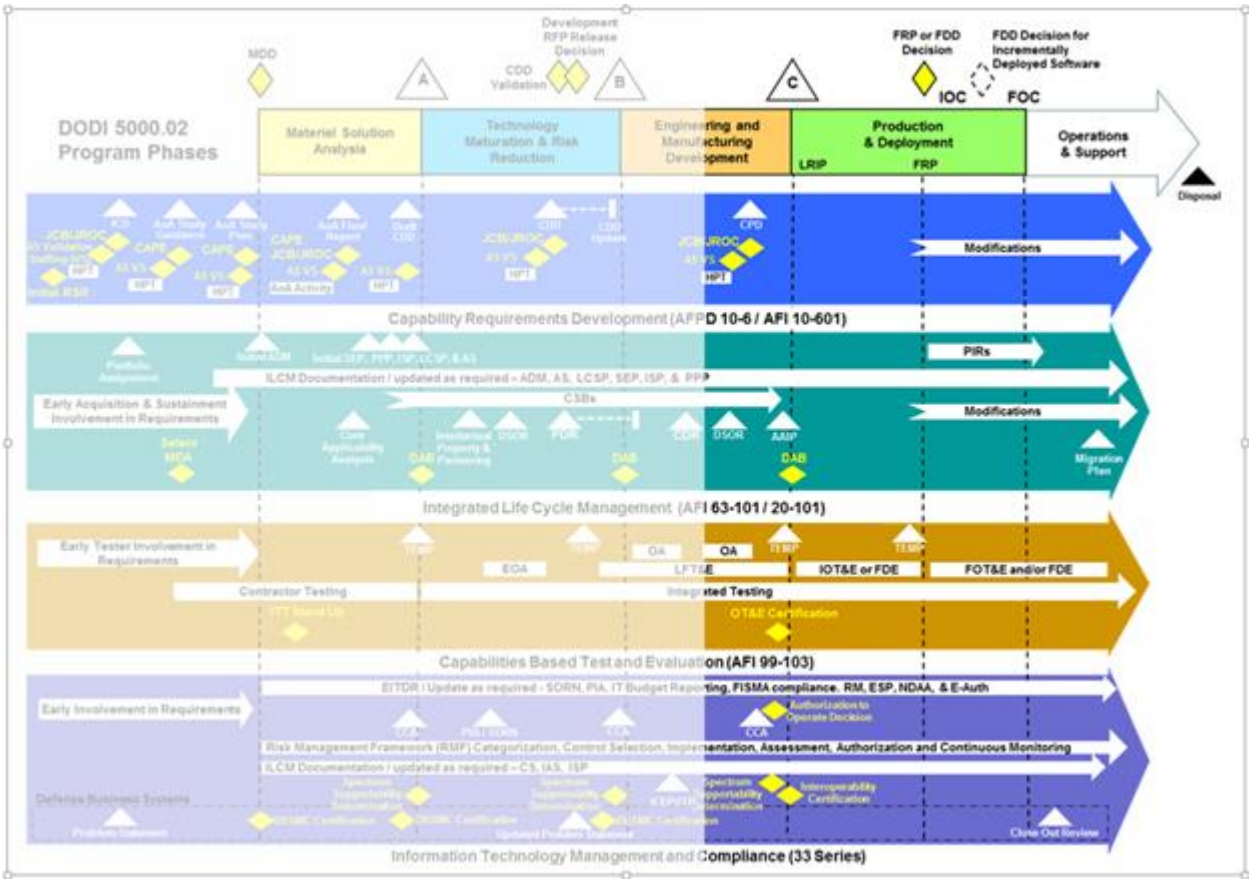
5.23. Assessment of Sufficiency of Developmental Test and Evaluation. Assessment of sufficiency of test is required by Directive-Type Memorandum 19-007. The Milestone Decision Authority for Major Defense Acquisition Programs must provide an assessment of Developmental Test and Evaluation sufficiency as part of the Milestone B and Milestone C brief summary reports. This assessment must be provided to the Service Acquisition Executive prior to the milestone decision. AF/TE will approve the sufficiency assessments for Major Defense Acquisition Programs for which the Service Acquisition Executive is the Milestone Decision Authority. **(T-0).** AF/TEP will work with the Lead Developmental Test and Evaluation Organization to obtain the required information. The Milestone B assessment must address the sufficiency of Developmental Test and Evaluation plans within the Test and Evaluation Master Plan, schedule, resources, mitigation of risks, and Developmental Test criteria for entering the production phase. See **Paragraph 6.5.3** for Milestone C requirements. Reference Directive-Type Memorandum 19-007 for details including responsibilities and the assessment memo template.

Chapter 6

TEST AND EVALUATION ACTIVITIES IN SUPPORT OF MILESTONE C AND BEYOND

6.1. Post Milestone B. The most important activities after the Milestone B decision and during the Engineering and Manufacturing Development and Production and Deployment phases are shown in **Figure 6.1**. This chapter focuses on test execution supporting the Milestone C, Full Rate Production and Full Deployment decisions. Sustained, high quality tester activity and collaboration with all program stakeholders must continue. The Integrated Test Team and individual test teams implement integrated test plans and activities and report test and evaluation results to decision makers.

Figure 6.1. Integration of Requirements, Acquisition, and Test and Evaluation Events Supporting Milestone C and Beyond.



6.2. Refining the Test and Evaluation Master Plan. The Integrated Test Team should continue refining the Test and Evaluation Master Plan to support the development of test plans that are integrated. Building on the work done in previous Test and Evaluation Master Plans, continue refining the Critical Operational Issues, Critical Technical Parameters, test objectives, Measures of Effectiveness, Measures of Suitability, Measures of Performance, resources and schedules as necessary, and update the Operational Evaluation Framework. The Test and Evaluation Master Plan and operational test plans must incorporate any new validated threats and, or environments

that may impact operational effectiveness. Test teams continue planning for execution of test plans that are integrated, covering as many Developmental Test and Evaluation, and operational test objectives as possible prior to dedicated operational testing. A series of Operational Assessments should be integrated into the test program to reduce program risk. Test and evaluation and systems engineering practitioners use Scientific Test and Analysis Techniques methodologies to optimize the overall number of test events and test articles without compromising test objectives. Tester activities during the Engineering and Manufacturing Development phase and beyond help identify performance shortfalls and other areas that could cause unintended increases in development, operations, and life cycle costs. The integrated test strategy should describe modeling and simulation tools and Digital System Models for test design, systems engineering, and data evaluation, and how these supplement, augment, and extrapolate empirical test and evaluation data wherever practical. Description of the verification, validation, and accreditation of all models should be included.

6.3. Developing Integrated Test Plans. The integrated test strategy integrates all individual contractor and government test plans into a linked series of evaluations compatible in objectives, schedule, and resources. These plans are focused on the current increment, with follow-on increments described in lesser detail. The Integrated Test Team must plan for Operational Assessments intermingled with operationally relevant Developmental Test and Evaluation to produce increasing amounts of operationally relevant data within each increment.

6.3.1. Operational Assessments. One or more Operational Assessments, if appropriate, should be planned and conducted early enough in the Engineering and Manufacturing Development phase to provide operational inputs to requirements and system development prior to Milestone C. Operational Assessments must be tailored to emphasize an integrated testing approach for assessing system capabilities in preparation for dedicated operational testing.

6.3.2. Integrated Testing. Integrated test plans should support each increment with Developmental Test and Evaluation and one or more Operational Assessments if appropriate. These plans should address as many of the Critical Operational Issues, Measures of Effectiveness, and Measures of Suitability as possible. Timely, credible, and continuous feedback must be provided to developers, users, and decision-makers before dedicated operational testing begins.

6.3.3. Specialized Testing. Specialized types of test and evaluation described in **Table 3.2** required to be completed by Milestone C should be designed to support dedicated operational testing that concentrates on mission impacts and unanswered Critical Operational Issues, Measures of Effectiveness, Measures of Suitability, and Measures of Performance. The dedicated operational test plan may use operationally relevant data collected during previous testing to verify capability requirements.

6.4. Realistic Testing. Conduct operational tests in a realistic operational environment, using production representative articles, to evaluate a system's overall effectiveness and suitability, and to assess impacts to wartime and peacetime operations. See descriptions of operational testing in the *Defense Acquisition Guidebook.*

6.4.1. Threats and Capabilities. To support Milestone C or any deployment decisions, the Integrated Test Team must ensure test plans are updated to include new validated threats, enemy TTPs, environments as well as any added capability requirements.

6.4.2. Virtual Test Environment. Systems with large Information Technology content and Defense Business Systems should use a "virtual" environment whenever possible that emulates real-world networks and threats.

6.4.3. Deferment of Operational Testing. Operational testers will not defer testing of any Key Performance Parameters, Critical Operational Issues, or operational requirements to future increments unless planned for in the Acquisition Strategy and Test and Evaluation Master Plan. If an unplanned deferral is unavoidable at the Milestone C or Full Rate Production and Full Deployment decision, the Program Manager will consult with the using command and requirements authorities to decide on the best strategy for completing the deferred testing. If the decision is documented in an approved Acquisition Decision Memorandum and/or Test and Evaluation Master Plan, an Operational Test and Evaluation waiver is not required. See **Paragraph 4.11** and **Paragraph 5.22**

6.4.4. Support of AFOTEC-Conducted Operational Testing. MAJCOM operational units, test centers, complexes, and other Developmental Test and Evaluation organizations may be requested to support AFOTEC-conducted operational testing. This support is documented in Test and Evaluation Master Plans, Test Resource Plans, Integrated Test Team charters, test plans, memorandums of agreement, and directed in MAJCOM test project orders. AFOTEC prepares Test Resource Plans in time to budget during the Program Objective Memorandum cycle.

6.4.5. Tests Involving Personnel. When personnel are used as human subjects, as defined in DoDI 3216.02_AFI40-402, *Protection of Human Subjects and Adherence to Ethical Standards in Air Force Supported Research*, the level of risk to the person must be documented. Personnel evaluating a system under test are not considered human test subjects. Review by an Institutional Review Board for Protection of Human Subjects in Testing must be completed prior to any test event. Personnel are defined as test subjects when their performance/capability is evaluated as a target of the test. See AFMAN 63-119, **Attachment 23**, for additional information.

6.5. Certification of System Readiness for Dedicated Operational Testing. The Program Manager will implement the Certification of System Readiness for Dedicated Operational Test review process described in AFMAN 63-119 as early as practical during the Engineering and Manufacturing Development phase. Developmental and operational testers participate and assist the Program Manager in preparation for Operational Test and Evaluation, and carrying out responsibilities as agreed. The readiness certification is mandatory but tailorable for all programs, including in the operations and maintenance phase (e.g., modifications and sustainment) where Operational Test and Evaluation will support a deployment of Full Rate Production and Full Deployment decision. The process and reporting of results may be tailored to suit program objectives as long as they comply with the requirements of AFMAN 63-119.

6.5.1. Operational Test and Evaluation Certification. For programs on the DOT&E Oversight List, the Service Acquisition Executive determines system readiness for Initial Operational Test and Evaluation. The DOT&E Oversight List is found at the following link: **https://extranet.dote.osd.mil/oversight/index.html**. For other programs, the Milestone Decision Authority is the Operational Test and Evaluation Certification official. The Service Acquisition Executive or Milestone Decision Authority may delegate this authority (via Acquisition Decision Memorandum) to the responsible Program Executive Officer.

Operational Test and Evaluation Certification Officials for smaller programs originating at MAJCOM or Center levels may be delegated by Milestone Decision Authority to a subordinate level as appropriate. For Major Defense Acquisition Programs, Acquisition Category I/Acquisition Category II programs, or any program on DOT&E oversight, the Program Manager will not be the Operational Test and Evaluation Certification Official for his/her own program. The Operational Test and Evaluation Certification Official determines the overall scope and schedule for the operational test readiness review and certification process in accordance with AFMAN 63-119, **Chapter 1**. The Certification Official and the planned implementation of the certification process will be identified in the Test and Evaluation Master Plan.

6.5.2. The Readiness Certification Process. To be certified ready for dedicated operational testing, the system must be mature, production and operationally representative, demonstrate stabilized performance in an operationally relevant environment, and all necessary test support must be available as planned. The certification process must be a continuous effort, not a single event in time. Multiple reviews at logical waypoints in a program are strongly encouraged such as prior to each operational assessment and milestone decision point. Critical Operational Issues, Measures of Effectiveness, Measures of Performance, and Measures of Suitability must be reviewed for relevance and achievability before entering dedicated Operational Test and Evaluation. The system must have a high likelihood of a successful operational test. Identified shortfalls or Deficiency Reports will be remedied before dedicated operational testing starts or work-around solutions will be developed, negotiated and documented between the Program Manager, user, and operational testers. Automated certification process tracking tools for all templates found in AFMAN 63-119 are available at the following website: **https://haf-te.sharepoint.afncr.af.mil/SitePages/Home.aspx**. Modify these tools as needed to match any changes made to the templates.

6.5.3. Program Assessments. DD(DTE&P) provides program assessments for decision points including request for proposal, Milestone B, and Milestone C. The Program Manager should work with the DD (DTE&P) representative on the Integrated Test Team to synchronize conduct of the final AFMAN 63-119 certification review and program assessment to avoid duplication of effort.

6.5.4. Developmental Test and Evaluation Sufficiency Assessments. For Milestone B and Milestone C, the requirement for Developmental Test and Evaluation Sufficiency Assessments is codified in Directive-Type Memorandum 19-007. The Milestone C assessment must address sufficiency of Developmental Test and Evaluation completed, plans and resources for remaining Developmental Test and Evaluation, mitigation of risks, and readiness of the system to perform Initial Operational Test and Evaluation. AF/TEP will work with Lead Developmental Test and Evaluation Organization to ensure data is obtained to complete the Developmental Test Sufficiency Assessment and provided to the Service Acquisition Executive prior to the milestone decision.

6.5.5. Final Certification of Readiness for Dedicated Operational Testing. Final certification review and briefing of system readiness must be completed 45 calendar days prior to the planned start of dedicated operational testing to allow time for last minute program adjustments or deficiency corrections. This time may be shorter if the Program Manager and operational testers mutually agree. Certification requires a formal briefing (or less, if justified by program scope, OSD interest, etc.) to the Operational Test and Evaluation Certification Official. The

briefing shall address Developmental Test and Evaluation results, conclusions, recommendations, identified deficiencies and workarounds, and an assessment of the system's capability to meet operational requirements. Workarounds will be vetted by the Operational Test Organization or requirements sponsor. AFMAN 63-119 will be used as a guide to structure the briefing and demonstrate readiness. Both operational testers and developmental testers are represented at the briefing. The briefing shall inform the Operational Test and Evaluation Certification Official of any outstanding disagreements between the Operational Test Organization, user, and the Program Manager. The Operational Test and Evaluation Certification Official forwards a certification of readiness memo to the Operational Test Organization commander at least 15 calendar days prior to the start of dedicated operational testing, or as agreed.

6.5.6. Operational Test and Evaluation Readiness Agreement. The Program Manager, user, and operational testers must coordinate regularly throughout the system's development to address Operational Test and Evaluation readiness shortfalls. Program Managers, jointly with their Operational Test and Evaluation counterparts, shall provide the Operational Test and Evaluation Certification Official detailed mitigation strategies for open shortfalls found during Developmental Test and Evaluation, and will identify outstanding disagreements on Operational Test and Evaluation readiness between the Operational Test Organization, user, and the program office prior to the formal certification briefing. The Operational Test and Evaluation Certification Official is responsible for weighing all factors before certifying readiness, and it is the Program Manager's responsibility to ensure the Operational Test and Evaluation Certification Official is made fully aware of all areas of Operational Test Organization, user, and program office concern. In all cases, identified shortfalls or Deficiency Reports must be either remedied before dedicated operational testing starts, or mitigated via agreement or workarounds negotiated between the Program Manager, user, and operational testers. If necessary, the Operational Test and Evaluation Certification Official and Operational Test Organization equivalent counterpart shall negotiate and plan the Operational Test and Evaluation way forward before formalizing the certification of readiness memo. If agreement cannot be reached at this point, outstanding issues may be elevated to SAF/AQ and AF/TE for final resolution.

6.5.7. Considerations for Early Deployment of Prototypes. Use the applicable certification templates in AFMAN 63-119 to review the system's capabilities, limitations, and readiness prior to early operational deployment of prototypes, Urgent Operational Needs, Joint Emergent Operational Needs, Quick Reaction Capabilities, and Joint Capability Technology Demonstrations.

6.5.8. Certification for Systems with Multiple Increments or Releases. If a system is fielded in multiple releases or increments (common with Information Technology and software intensive systems), then the Program Manager ensures the Operational Test and Evaluation Certification Official provides a certification of readiness to the Operational Test Organization commander prior to the decision to commence operational testing of each individual release. The certification should be tailored to and pertain specifically to the planned release of capability. For example, information technology systems using rapid release methodologies may substantially compress their certification schedule and reduce the number of certifications and templates reviewed. Releases may require substantially less time and effort than an increment.

6.6. Plans and Briefings for Operational Testing. DOT&E requires operational testers (i.e., the Operational Test Organization) to submit written plans and present briefings as discussed below for programs on OSD Operational Test and Evaluation Oversight. The information requirements below apply in full to AFOTEC and MAJCOMs unless DOT&E relief is documented. See **Attachment 2** for a summary.

6.6.1. Operational Test Concept Briefings. DOT&E requires a test concept briefing a minimum of 180 calendar days before the start of dedicated operational tests and assessments for programs on OSD Operational Test and Evaluation Oversight. AF/TEP should arrange for corporate Air Force-level reviews of test concept briefings. User and developer representatives are required to attend these briefings. For multi-Service programs, the other Services will also be invited. A pre-brief to the Air Staff may be required before going to DOT&E. Coordinate with AF/TEP for pre-brief requirements. DOT&E may elect to defer this requirement and accept a later briefing of the final operational test plan in lieu of the test concept briefing.

6.6.2. Operational Test Plans and Test Plan Briefings. An operational test plan should be delivered with sufficient time for developmental testers to ensure the system is ready for operational test and is due to DOT&E a minimum of 60 calendar days prior to test start. DOT&E may request, or the Operational Test Organization may elect, to present a briefing to accompany the final test plan. This briefing will be coordinated the same way as an operational test concept briefing.

6.7. OSD Involvement. Programs on Developmental Test and Evaluation, Live Fire Test and Evaluation, and/or Operational Test and Evaluation Oversight remain under continuous OSD surveillance through fielding and into sustainment until removal from the OSD Test and Evaluation Oversight List. The Integrated Test Team must be prepared for additional briefings to OSD and test plan approvals as described in **Paragraph 4.7** Additional briefings requested by DOT&E should be routed through AF/TEP before submission to OSD. The information required for OSD Test and Evaluation Oversight programs is summarized in **Attachment 2**.

6.8. Operational Tester Deficiency Report Responsibilities. Prior to the Full Rate Production and Full Deployment decision review, operational testers and users complete a final prioritization of all open Deficiency Reports for resolution and funding. The MAJCOM's priorities must be used for rank-ordering these Deficiency Reports. The final priorities are forwarded to the Program Manager to help direct corrective actions and will be listed in the final report.

6.9. Interoperability Certification Testing. Comprehensive interoperability testing which involves system testing, in an operationally realistic environment, must be completed and interoperability certification granted by JITC or comparable authority before an information technology system, upgrade, or capability can be fielded.

6.10. Tracking and Closing Deficiency Reports. Not all open Deficiency Reports may receive funding or be corrected after a system is accepted for operational use. The database of open Deficiency Reports may provide the only documentation of unsatisfactory conditions or worthwhile system enhancements. At no time will the program office unilaterally close or downgrade Deficiency Reports without formal consultation with the originating test organization and MAJCOM project officer. MAJCOM project officers must continue to track open Deficiency Reports until they are corrected, or the MAJCOM concurs with closing them. Deficiency Reports closed due to lack of resources should be annotated and tracked until the root cause or deficiency is corrected or mitigated.

6.11. Modifications. Modifications change the form, fit, function, and/or interface of an in-service, configuration-managed AF asset. Modifications may be temporary or permanent. See AFI 63-101_20-101 for more detail on modification types.

6.11.1. Temporary-1 modifications change the configuration to enable short-term operational mission accomplishment. Temporary-1 modifications typically use commercially available off-the-shelf items or non-developmental items. The Program Manager for the system has configuration control of the system and is responsible to evaluating, integrating, and installing these modifications. In conjunction with Program Manager, the MAJCOMs conduct testing of the installed modification to ensure Operational Safety, Suitability, and Effectiveness is not compromised.

6.11.2. Temporary-2 modifications may involve installation of test and evaluation support equipment to obtain data for Developmental Test and Evaluation and Operational Test and Evaluation. Test organizations and the Program Manager must ensure Operational Safety, Suitability, and Effectiveness of Temporary-2 modified assets.

6.11.3. Permanent modifications that change the configuration of an asset/software for operational effectiveness, suitability, survivability, safety, service life extension, and/or reduce ownership costs of a fielded weapon system, subsystem, or item must follow the AF Form 1067, *Modification Proposal*, process found in **Attachment 2** of AFI 63-101_20-101, and the AF/A5R Requirements Development Guidebook and may require an additional amount of developmental test and operational test prior to fielding.

6.12. Integrated Testing During Sustainment and Follow-on Increments. Follow-on increments and modifications continue in parallel with and subsequent to acquisition of the first increment. Operational Test and Evaluation is required for each increment of capability prior to release to the user. This testing is structured according to the program's Acquisition Strategy, Test and Evaluation Master Plan, and updated requirements documents.

6.12.1. The existing Integrated Test Team should continue functioning to ensure continuity of test and evaluation operations. All areas of the Integrated Test Team charter should be carefully reviewed and modified as necessary.

6.12.2. The test and evaluation activities described in **Chapter 4**, **Chapter 5**, and **Chapter 6** must be tailored for risk, new or revised Joint Capabilities Integration and Development System requirements, and other factors, and repeated as needed during the Operations and Support phase. Testers should capitalize on previously completed work products, tactics, techniques, and procedures, analyses, results, and lessons learned, thus eliminating redundant testing and work. Sustainment acquisitions, to include support equipment and Form, Fit, Function, and Interface replacements, require Full Rate Production and Full Deployment decisions and an appropriate type of operational testing.

6.13. Disposing of Test Assets. Test assets (e.g., instrumentation and test articles) from canceled or completed tests are catalogued and returned to government test and evaluation organizations, or acquisition or sustainment programs, or refurbished and reassigned to owning MAJCOMs. Surplus or unusable items are sent to the applicable Defense Reutilization Management Office.

6.13. (AFMC) Disposing of Test Assets. Program managers ensure disposal of test assets IAW AFI 16-402.

6.14. Operational Test Reporting on Fielding of Prototypes or Pre-Production Systems. Warfighter operational needs may require rapid and/or early fielding of new capabilities. This may result in early operational use of prototypes, technology demonstration systems, test articles, or pre-production systems prior to the completion of required dedicated operational testing and formal production decisions. In these situations, the Operational Test Organization (as determined in **Paragraph 4.6**) may opt to produce a Capabilities and Limitations Report to inform the warfighter and fielding decision authorities. The Capabilities and Limitations Report provides the most current operational test perspective on developmental system capabilities and limitations based on testing done to date. See **Paragraph 7.5** for more information about Capabilities and Limitations Reports.

Chapter 7

TEST AND EVALUATION REPORTING

7.1. General Reporting Policy. Test reports must be timely, factual, concise, and tailored to the needs of decision makers. Test teams should provide continuous feedback to program managers and decision makers consistent with test activities when they occur, whereas a formal test report should be delivered in time to support the designated milestone or decision review including addressing the need for having approved test reports prior to advancing to the next tier of formal testing during Developmental Test and Evaluation. All test and evaluation plans describe which kinds of reports are required, their contents, and when and to whom they are submitted. All test reports contain evaluations of test results and conclusions. Additional findings, considerations, remaining risks, test limitations and recommendations are not required but may be included if deemed appropriate. All reports must be properly archived and retrievable for future use. Reporting requirements for programs on OSD Test and Evaluation Oversight are summarized in **Attachment 2**. All days are "calendar days" unless otherwise stated.

7.2. Developmental Test and Evaluation Reports. The types and frequency of Developmental Test and Evaluation reports and memorandums are tailored to meet decision makers' requirements as documented in the Test and Evaluation Master Plan and test plan. Developmental Test and Evaluation data and analytic support must be provided to the program decision review process to certify the system is ready for dedicated Initial Operational Test and Evaluation. Live Fire Test and Evaluation reports must be submitted to DOT&E 45 calendar days prior to the Beyond-Low-Rate Initial Production decision review. The Program Manager documents requirements for contractor test reports in the Contract Data Requirements List. Formal briefings are generally not required.

7.3. Developmental Test and Evaluation Report Distribution. The Integrated Test Team will develop a distribution list for all Developmental Test and Evaluation reports which includes operational testers, Executing Test Organizations, Participating Test Organizations, Program Executive Officer, applicable MAJCOMs, AF/TE, Center Test Functional Leaders, and Defense Technical Information Center. Developmental Test and Evaluation reports are not releasable to non-government agencies without prior approval and coordination of the Program Manager. Release of contractor test reports may be subject to restrictions in the contract. For OSD Test and Evaluation Oversight programs, the Program Element Monitor will send a copy through appropriate channels to DD(DTE&P) and DOT&E if required.

7.4. Operational Test Reports.

7.4.1. Significant Test Event Reports. These reports briefly describe the results of significant test events during operational test activities. Operational testers submit these reports to the appropriate agencies (e.g., Program Manager, Chief Developmental Tester or Test Manager, Lead Developmental Test and Evaluation Organization, Participating Test Organizations, operational MAJCOM, Program Element Monitor, Program Executive Officer, Center Test Functional leaders, AF/TE, and/or DOT&E, depending upon level of interest in the program) within 24 hours of any significant test event as described in the test plan.

7.4.2. Final Reports. Final reports should normally be delivered not later than 45 calendar days prior to the supported decision in order to provide adequate time for review. Delivery timelines

may be tailored to accommodate accelerated test schedules for specific user needs if coordinated with the decision review authority. Reports must address each of the Critical Operational Issues as well as the system's operational effectiveness and suitability. These reports must strike the proper balance between system capabilities and limitations while taking into account how well the system performed mission essential tasks. All Category I Deficiency Reports and the most important Category II Deficiency Reports will be listed to include a Risk Assessment of the overall state of the Deficiency Report issues. Detailed technical information should be published in separate data documents. Final report briefings are provided to HQ USAF staff and OSD, as requested.

7.4.3. Interim Reports. Decision makers may require written information about test and evaluation results during execution of an ongoing test plan or prior to the publication of the final report. Use these types of interim reports depending on the need.

7.4.3.1. Status Reports. A status report provides updates and important test findings during operational testing. Status report format and content are flexible. Status reports are normally very short (no more than several pages) and should not be written as a mini final report. It may be periodic (monthly, quarterly, or as required), associated with specific (planned test) events, or in response to an external organization or agency request for test status. Status reports may be used to inform fielding decisions associated with each release when an Operational Test and Evaluation, Operational Utility Evaluation, Force Development Evaluation, or Operational Assessment report is not required or applicable. The operational test plan should document the requirements for a status report to include the frequency and distribution for periodic status reports.

7.4.3.2. Interim Summary Reports. If the final report cannot be ready in time to support a key decision, the decision authority may instead accept a written summary report or a formal briefing. For oversight programs, AF/TE will help establish a new final report due date. If a briefing is used, a separate written interim summary report is not required. Any additional data collected is added to the final report when available.

7.4.4. Multi-service Operational Test and Evaluation Final Reports. The lead Operational Test Organization prepares a single Multi-service Operational Test and Evaluation final report aggregating all Operational Test and Evaluation information from the participating Services' inputs. Each participating Service has the option of preparing its own supplemental report as an attachment to the single Multi-service Operational Test and Evaluation report. All significant differences between Service test results should be explained. This guidance also applies to testing with other DoD or Federal agencies. See the memorandum of agreement on *Multi-service Operational Test and Evaluation and Operational Suitability Terminology and Definitions*. A single integrated multi-Service report will be submitted no later than 90 calendar days after the official end of test is declared by the Lead Operational Test Agency but no later than 45 calendar days prior to a milestone decision or the date announced for the final decision to proceed beyond Low-rate Initial Production. Briefings will be provided to HQ USAF staff and OSD as requested.

7.4.5. Reporting Sufficiency of Operational Test Review Results. Each MAJCOM may develop its own Sufficiency of Operational Test Review report format as needed. All conclusions and related recommendations based on the Sufficiency of Operational Test Review

will be formally documented. All data and data sources used to conduct the Sufficiency of Operational Test Review should be identified. See **Paragraph 3.5.11** and **Paragraph 4.6.6.3**

7.5. Capabilities and Limitations Reports. While not mandatory, the Capabilities and Limitations report is appropriate when a system or prototype is provided to units for training in preparation for fielding, or when the system is deployed directly to an operational unit. A Capabilities and Limitations report may also be appropriate to support MAJCOM urgent operational need or Joint (Joint Urgent Operational Need, Joint Emergent Operational Need) requests, or combat capability documents. To ensure maximum flexibility, Capabilities and Limitations reports have no prescribed format. The level of detail provided varies depending on the amount of pre-existing information available, the warfighter's need for technical information, and the amount of time and resources available to conduct additional testing before the fielding decision. The Capabilities and Limitations report should not make specific recommendations concerning the system fielding decision or release for training purposes. This report may be provided to DOT&E to support their requirement in 10 USC § 2399 for an early report to Congress.

7.5.1. Capabilities and Limitations reports are based on existing, verifiable test and evaluation data (contractor, developmental, and operational) derived from all available system development, ground, and flight test activities. The goal is to help warfighters gain early knowledge of potential operational effectiveness and suitability of systems that have not yet completed dedicated operational testing. Release of a Capabilities and Limitations report does not obviate the requirement for dedicated Operational Test and Evaluation. Six months after publication of the Capabilities and Limitations report, the Operational Test Organization should review program status to determine whether an updated Capabilities and Limitations report is necessary. Capabilities and Limitations reports will not drive new testing requirements for a system.

7.5.2. All relevant data sources used to develop the Capabilities and Limitations report should be identified. Include a program description and a summary of the current phase of formal system testing. The report should identify observed system capabilities and limitations and describe any areas of untested or unknown capabilities. Suitability observations, interoperability considerations, and cyber issues should also be included. The type and scope of planned, but not yet accomplished, testing should also be described. If time is available for a dedicated operational test event such as an Operational Utility Evaluation, then that alternative would obviate the need for a Capabilities and Limitations report. If an operational test event is in progress or recently completed, a status report or interim summary report may be more appropriate.

7.6. Anti-Tamper Reports. SAF/AQLS provides an independent anti-tamper evaluation report directly to the Milestone Decision Authority following anti-tamper validation and verification testing.

7.7. Operational Test Report Distribution. Operational testers send reports to the program stakeholders and Defense Technical Information Center as determined by the Integrated Test Team. For OSD operational test and evaluation oversight programs, AF/TE will forward copies to DOT&E and DD(DTE&P). A summary of operational test reporting requirements for OSD Test and Evaluation oversight programs is in **Attachment 2**.

7.8. Briefing Trail. AF/TE will arrange for Air Force-level review(s) of test report briefings. For multi-Service programs, the other participating Services will be invited to the briefing. The

Program Manager must be prepared to address technical questions, program issues, Developmental Test and Evaluation, and the resolution of deficiencies. Users must be available to answer questions regarding operational requirements and mission impacts of fielding the system.

7.9. Distributing and Safeguarding Test Information.

7.9.1. Within DoD. Test organization commanders determine release authority for data, reports, and information under their control. DoDI 5230.24, *Distribution Statements on Technical Documents,* provides guidance on proper distribution statements for Scientific and Technical Information documents and AFI 61-201, *Management of Scientific and Technical Information (STINFO),* provides guidance and procedures on creating, protecting, disseminating, archiving or destroying Air Force scientific and technical information test documentation. Anti-tamper security classification guidance requires all anti-tamper testing and reporting be conducted within US-only channels. Classified test information cannot be released except as specified in DoDI 5200.01, *DoD Information Security Program and Protection of Sensitive Compartmented Information (SCI),* and associated documents.

7.9.2. Outside DoD. Test directors do not have release authority for test information and communications outside DoD channels. Freedom of Information Act requests should be processed in accordance with DoDM 5400.07_AFMAN 33-302, *Freedom of Information Act Program*. Test information released to Congress, the General Accountability Office, the DoD Inspector General, or similar agencies must follow guidance in AFI 90-401, *Air Force Relations with Congress*. Provide an informational copy to AF/TE on any test information released to outside agencies. SAF/IAPT, the Weapons, Disclosure and Technology Transfer Division, is the designated Air Force disclosure authority for release of classified and controlled unclassified weapons systems, technologies and information to foreign governments and international organizations in support of Air Force, DoD and commercial international programs.

7.10. Information Collection and Records.

7.10.1. No information collections are created by this publication.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

10 United States Code (USC), Armed Forces, §§ 2366, 2399, and 2350a(g)

(Added-AFMC) AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles,* 19 July 2005

(Added-AFMC) DoD 8570.01-M, *Information Assurance Workforce Improvement Program,* 10 November 2015

P.L. 103-160 § 220, National Defense Authorization Act for Fiscal Year 1994, as amended by P.L. 103-337 § 214

P.L. 111-23 § 102(b)(1), Weapon Systems Acquisition Reform Act of 2009

P.L. 114-92 § 804, National Defense Authorization Act for Fiscal Year 2016, (P.L. 114-92; 10 U.S.C. 2302 note), as amended by P.L. 115-91 § 866

DoD Dictionary of Military and Associated Terms, February 2019

CJCSI 5123.01H, *Charter of the Joint Requirements Oversight Council (JROC) and Implementation of the Joint Capabilities Integration and Development System*, 31 August 2018

USD(R&E) DTM 19-007, *Developmental Test and Evaluation Sufficiency Assessments*, 18 July 2019

DoDM 5400.07_AFMAN 33-302, *Freedom of Information Act Program*, 26 April 2018

DoD 7000.14-R, *Department of Defense Financial Management Regulations (FMRs)*, Vol. 2A, June 2017

DoD Joint Special Access Program Implementation Guide, 11 April 2016

DoDD 5000.71, *Rapid Fulfillment of Combatant Commander Urgent Operational Needs, 24* August 2012

DoDD 5141.02, *Director of Operational Test and Evaluation (DOT&E),* 2 February 2009

DoDD 5200.47E, *Anti-Tamper (AT),* 4 September 2015

Defense Security Cooperation Agency 5105.38-M, *Security Assistance Management Manual,* 30 April 2012

DoDI 3216.02_AFI40-402, *Protection of Human Subjects and Adherence to Ethical Standards in Air Force-Supported Research*, 10 September 2014

DoDI 4650.08, *Positioning, Navigation, and Timing (PNT) and Navigation Warfare (NAVWAR)*, 27 December 2018

DoDI 5000.02, *Operation of the Defense Acquisition System*, 7 January 2015

DoDI 5000.66, *Defense Acquisition, Workforce Education, Training, and Career Development Program, 27* July 2017

DoDI 5000.75, *Business Systems Requirements and Acquisition*, 2 February 2017

DoDI 5010.41, *Joint Test and Evaluation (JT&E) Program*, 12 September 2005

DoDI 5134.17, *Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E))*, 25 October 2011

DoDI 5200.01, *DoD Information Security Program and Protection of Sensitive Compartmented Information (SCI)*, 21 April 2016

DoDI 5200.39, *Critical Program Information (CPI) Identification and Protection Within Research, Development, Test, and Evaluation (RDT&E)*, 28 May 2015

DoDI 5200.44, *Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN)*, 5 November 2012

DoDI 5230.24, *Distribution Statements on Technical Documents*, 23 August 2012

DoDI 8100.04, *DoD Unified Capabilities (UC)*, 9 December 2010

DoDI 8330.01, *Interoperability of Information Technology (IT), Including National Security Systems (NSS)*, 21 May 2014

DoDI 8510.01, *Risk Management Framework (RMF) for DoD Information Technology (IT)*, 12 March 2014

DoDI O-3600.03, *Technical Assurance Standard (TAS) for Computer Network Attack (CNA) Capabilities*, 22 April 2010

DoDI S-3100.15, *Space Control (U)*, 19 January 2001

Air Force Doctrine Annex, *Air Force Glossary*, 18 July 2017

AFMD 14, *Air Force Operational Test and Evaluation Center (AFOTEC)*, 11 July 2017

HAFMD 1-52, *Director of Test and Evaluation*, 7 February 2019

(Added-AFMC) AFI 11-401_AFMCSUP, *Aviation Management*, 07 February 2014

(Added-AFMC) AFI 16-402, *Aerospace Vehicle Programming, Assignment, Distribution, Accounting, and Termination*, 27 September 2019

(Added-AFMC) AFI 21-103, *Equipment Inventory, Status and Utilization Reporting*, 21 January 2020

(Added-AFMC) AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

(Added-AFMC) AFI 91-202_AFMCSUP, *The US Air Force Mishap Prevention Program*, 17 May 2017

AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems*, 8 March 2007

AFPD 16-2, *Disclosure of Military Information to Foreign Governments and International Organizations*, 4 August 2016

AFPD 16-6, *International Arms Control and Nonproliferation Agreements and the DoD Foreign Clearance Program*, 27 March 2018

AFPD 99-1, *Test and Evaluation*, 20 June 2018

AFI 10-703, *Electronic Warfare (EW) Integrated Reprogramming*, 4 June 2014

AFI 10-1202, *Space Test Program (STP) Management*, 15 November 2010

AFMAN 11-260, *Tactics Development Program*, 25 October 2019

AFMAN 13-212V1, *Range Planning and Operations*, 22 June 2018

AFI 16-1001, *Verification, Validation and Accreditation (VV&A)*, 22 June 2016

AFI 16-1005, *Modeling & Simulation Management*, 23 June 2016

AFI 16-1007, *Management of Air Force Operational Training Systems*, 1 October 2019

AFI 16-1404, *Air Force Information Security Program*, 29 May 2015

AFI 17-101, *Risk Management Framework (RMF) for Air Force Information Technology (IT*), 2 February 2017

AFI 17-130, *Cybersecurity Program Management*, 31 August 2015

AFI 17-140, *Architecting*, 29 June 2018

AFI 33-360, *Publications and Forms Management*, 1 December 2015

AFI 36-1301, *Management of Acquisition Key Leadership Positions*, 23 July 2019

AFI 61-101, *Management of Science and Technology*, 14 March 2013

AFI 61-201, *Management of Scientific and Technical Information (STINFO)*, 29 January 2016

AFI 62-601, *USAF Airworthiness,*11 June 2010

AFI 63-101_20-101, *Integrated Life Cycle Management*, 9 May 2017

AFI 63-125, *Nuclear Certification Program*, 24 July 2017

AFI 63-145, *Manufacturing and Quality Management*, 30 September 2016

AFMAN 65-605V1, *Budget Guidance and Procedures*, 24 October 20182

AFI 90-401, *Air Force Relations with Congress*, 14 June 2012

AFI 91-204, *Safety Investigation and Reports,* 27 April 2018

AFI 91-205, *Nonnuclear Munitions Safety Board*, 23 May 2018

AFI 91-401, *Directed Energy System Safety*, 28 November 2018

AFI 99-106, *Joint Test and Evaluation Program*, 18 July 2019

AFMAN 99-108, *Programming and Reporting Aerial Target and Missile Expenditures in Test and Evaluation*, 9 May 2018

AFI 99-114-S, *Foreign Materiel Program (U)*, 22 March 2019

AFI 99-120, *Forecasting and Programming Munitions Telemetry and Flight Termination Systems*, 18 September 2017

AFI 33-363, *Management of Records*, 1 March 2008

AFMAN 63-119, *Certification of System Readiness for Dedicated Operational Testing*, 26 April 2019

AFMAN 63-144, *Business Capability Requirements, Compliance, and System Acquisition*, 25 July 2018

AFMAN 91-201, *Explosives Safety Standards*, 21 March 2017

AFMCI 63-1201, *Implementing Operational Safety Suitability and Effectiveness (OSS&E) and Life Cycle Systems Engineering (LCSE*), 28 March 2017

AFPAM 63-128, *Integrated Life Cycle Management*, 10 July 2014

AFSSI 7700, *Emission Security*, 24 October 2007

AFSSI 7702, *Emission Security Countermeasures Reviews*, 30 January 2008

CNSSI 1253, *Security Categorization and Control Selection for National Security Systems*, 27 March 2014

MIL-HDB-189C, *Reliability Growth Management*, 18 March 2016

NIST SP 800-30 Revision 1, *Guide for Conducting Risk Assessments*, September 2012

NIST SP 800-39, *Managing Information Security Risk: Organization, Mission, and Information System View*, March 2011

NIST SP 800-53A Revision 4, *Assessing Security and Privacy Controls in Federal Information Systems and Organizations: Building Effective Assessment Plans*, December 2014

SD-2, *DoD Acquisitions Buying Commercial and Nondevelopmental Items*, 1 November 2018

TO 00-35D-54, *USAF Deficiency Reporting, Investigation, and Resolution,* 1 September 2015

TO 00-5-1, *AF Technical Order System*, 15 February 2019

Air Force Test and Evaluation Guide, 7 August 2018

AF/A5R Requirements Development Guidebook, Volume 1-4, 31 October 2018; Volume 5, 11 Jan 2019

Defense Acquisition Guidebook, 26 February 2018

DoD Guide for Achieving Reliability, Availability, and Maintainability, 3 August 2005

DD(DTE&P)'s Guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts*, 24 October 2011

Memorandum of Agreement on Multi-Service Operational Test and Evaluation (MOT&E) and Operational Suitability Terminology and Definitions, Feb 2017, Supplement 1, 11 August 2017

DoD Cybersecurity Test and Evaluation Guidebook, Version 2.0, April 25, 2018

Director, Operational Test and Evaluation (DOT&E) Test and Evaluation Master Plan Guidebook Version 3.1, 19 January 2017

DoD Test and Evaluation Management Guide, 6th ed., December 2012, Defense Acquisition University

DOT&E Memorandum, *Timeliness for Operational Test and Evaluation Plans*, 24 June 2011

USD Memorandum, *Key Leadership Positions and Qualification Criteria*, 8 November 2013

Prescribed Forms

(**Added-AFMC**) AFMC Form 42, *Lead Developmental Test & Evaluation Organization*

None

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

AF Form 1067, *Modification Proposal*

SF Form 368, *Product Quality Deficiency Report*

Abbreviations and Acronyms

ACC—Air Combat Command

AF—Air Force

AFLCMC—Air Force Life Cycle Management Center

AFJO—Air Force Joint Test Program Office

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFMD—Air Force Mission Directive

AFOTEC—Air Force Operational Test and Evaluation Center

AFPAM—Air Force Pamphlet

AFPD—Air Force Policy Directive

(Added-AFMC) AFSEO—Air Force SEEK EAGLE Office

AFSPC—Air Force Space Command

AFSSI—Air Force Systems Security Instruction

AFTC—Air Force Test Center

AO—Action Officer

ATEC—Army Test and Evaluation Command

(Added-AFMC) CDT—Chief Developmental Tester

CIO—Chief Information Officer

CJCSI—Chairman of the Joint Chiefs of Staff Instruction

CNSSI—Committee on National Security Systems Instruction

DAU—Defense Acquisition University

DoD—Department of Defense

DoDD—Department of Defense Directive

DoDI—Department of Defense Instruction

DTM—**-**Directive-Type Memorandum

FDE—Full Deployment Evaluation

FOT&E—Follow-on Operational Test and Evaluation

FRP—Full-Rate Production

FY—Fiscal Year

HAF—Headquarters Air Force

HAFMD—Headquarters Air Force Mission Directive

HQ—Headquarters

ILCM—Integrated Lifecycle Management

ISR—Intelligence, Surveillance, and Reconnaissance

JITC—Joint Interoperability Test Command

JRMET—Joint Reliability and Maintainability Evaluation Team

LDTO—Lead Developmental Test and Evaluation Organization

LRIP—Low-Rate Initial Production

MAJCOM—Major Command

MCOTEA—Marine Corps Operational Test and Evaluation Agency

MIL-HDBK—Military Handbook

MOT&E—Multiservice Operational Test and Evaluation

NDAA—National Defense Authorization Act

NIST—National Institute of Standards and Technology

NSS—National Security System

OA—Operational Assessment

OCR—Office of Collateral Responsibility

OPR—Office of Primary Responsibility

OPTEVFOR—Operational Test and Evaluation Force

OSD—Office of the Secretary of Defense

OT&E—Operational Test and Evaluation

P.L.—Public Law

(Added-AFMC) PMO—Program Manager Office

RMF—Risk Management Framework

SAF—Secretary of the Air Force

SF—Standard Form

SMC—Space and Missile Systems Center

SORN—System of Records Notice

(Added-AFMC) T&E—Test and Evaluation

TEMPEST—Transient Electromagnetic Pulse Surveillance Technology

TM—Test Manager

TO—Technical Order

TTP—Tactics, Techniques, and Procedures

USAF—United States Air Force

USAFWC—United States Air Force Warfare Center

USC—United States Code

Terms

(Added-AFMC) Foreign Military Sales—That portion of U.S. security assistance authorized by the Foreign Assistance Act (FAA) of 1961, and the Arms Export Control Act (AECA). The recipient provides reimbursement for defense articles and services transferred from the United States. This includes cash sales from stocks (inventories, services, or training) by DoD.

(Added-AFMC) Letter of Offer and Acceptance—The DoD document used to offer articles, services, or military construction for sale to partners.

Note 1—A common understanding of terms is essential to effectively implement this instruction. "**Notes**" and italicized words in brackets at the end of definitions are not an official part of that definition, and are added for clarity for information only.

Note 2—For additional terms and definitions not listed below, see *DoD Dictionary of Military and Associated Terms*, and Air Force Doctrine Annex, *Air Force Glossary*, which contain standardized terms and definitions for DoD and Air Force use. Also see *DoD Test and Evaluation Management Guide*, 6th edition, Defense Acquisition University (DAU) Press. **Note:** See the AF/A5R Requirements Development Guidebook, Volume 1 and AFI 63-101_20-101 for definitions of terms relating to the requirements and acquisition processes.

Accreditation—The official determination that a model or simulation is acceptable for use for a specific purpose.

Acquisition Category—Acquisition categories determine the level of review, decision authority, and applicable Test and Evaluation policies and procedures. They facilitate decentralized decision making and execution, and compliance with statutorily imposed requirements.

Agile Software Development—A group of software development methodologies based on iterative and incremental development where requirements and solutions evolve through highly collaborative, self-organizing, cross-functional teams. Also, an iterative development approach that focuses on mature technologies, continuous testing, test-driven development, continuous user involvement, and requirements definition.

Availability—A measure of the degree to which an item is in the operable and committable state at the start of a mission when the mission is called for at an unknown (random) time.

BIG SAFARI—The 645th Aeronautical Systems Group (also known as the BIG SAFARI Program) executes sensitive United States Government and foreign military sales programs in support of high priority, rapid-requirement, and urgent operational needs by direction of the Assistant Secretary of the Air Force for Acquisition (SAF/AQ). BIG SAFARI is responsible for total life cycle ownership over those assigned programs and projects, and functions as Program Manager with systems engineering, Lead Developmental Test and Evaluation Organization, Operational Test Organization responsibilities to assure Operational Safety, Suitability, and Effectiveness of the systems(s) in coordination with the ultimate end user.

Block—Major capability release.

Build—a testable, integrated subset of the overall capability, which together with clearly defined decision criteria, ensures adequate progress is being made before fully committing to subsequent builds. Several software builds are typically necessary to achieve a deployable capability such as a release. Each build has allocated requirements, resources, and scheduled testing to align dependencies with subsequent builds and to produce testable functionality to ensure that progress is being achieved. A build is a developmental increment (version) of the system or software.

Capabilities and Limitations Report—An optional, quick-look report of limited scope that operational testers provide to operational commands and operational units to support rapid and/or early fielding of developing capabilities before dedicated operational testing is complete and formal production begins. It provides the most current operational test perspectives on system capabilities and limitations based on testing done to date, and describes any untested or unknown areas.

Capabilities-Based Testing—A mission-focused strategy for Test and Evaluation for verifying that a capabilities solution will enable operations at an acceptable level of risk. Capabilities-oriented evaluations are the primary Test and Evaluation methodology throughout system testing, but traditional evaluations of system performance measured against specification-like requirements are also used. Capabilities-based testing requires understanding operational concepts and involves developing strategies for Test and Evaluation and plans to determine whether a capability solution option merits fielding.

Category I Deficiency—Those deficiencies which may cause death, severe injury, or severe occupational illness; may cause loss or major damage to a weapon system; critically restricts the combat readiness capabilities of the using organization; or which would result in a production line stoppage, and for which there is no viable work-around.

Category II Deficiency—Those deficiencies that impede or constrain successful mission accomplishment (system does not meet minimum operational requirements but does not meet the safety or mission impact criteria of a Category I deficiency). It may also be a condition that complements, but is not absolutely required for, successful mission accomplishment. The recommended enhancement, if incorporated, will improve a system's operational effectiveness or suitability.

Center Test Functional Leader—The senior individual responsible for overseeing/managing Test and Evaluation functional processes and policy across the Center. Also responsible for managing the functional workforce, to include planning, advocating for Center resources,

identifying workforce competencies/gaps and providing highly skilled Test and Evaluation personnel to their supported organizations.

Charter—Formal document that helps set the stage for the rest of the acquisition process. Establishing the Charter helps to focus the acquisition team on the objectives of the effort. The purpose of a charter is to develop a structure to assign accountability and responsibilities for team members and to empower the team through senior stakeholder(s) approval and commitment. A charter could address the following: team purpose, description, and objectives; team deliverables; team membership, roles, and responsibilities; overall team responsibility; team's authority; operating agreements, rules of internal team communication; critical success factors; sign-off and approvals.

Chief Developmental Tester—A designated government Test and Evaluation professional in a Major Defense Acquisition Program or Major Automated Information System program office reporting to the Program Manager to coordinate, plan, and manage all Developmental Test and Evaluation activities, to include contractor testing, and who makes technically informed, objective judgments about Developmental Test and Evaluation results. For non-Major Defense Acquisition Program and non-Major Automated Information System programs, this person is known as the Test Manager.

Combined Test Force—An integrated team of military, civilian, and contractor Test and Evaluation professionals empowered to plan and execute tests and report results in a collaborative, effective, and efficient manner over the entire life cycle of a system.

Common Test and Evaluation Database—A repository of all available Test and Evaluation data for a single acquisition program or system under test that is accessible to all program stakeholders with a need to know.

Covered System—DoD term that is intended to include all categories of systems or programs requiring Live Fire Test and Evaluation. A covered system means a system that the Director, Operational Test and Evaluation, acting for the Secretary of Defense, has designated for Live Fire Test and Evaluation oversight.

Covered Product Improvement Program—See Covered System.

Critical Operational Issue—Operational effectiveness and operational suitability issues (not parameters, objectives, or thresholds) that must be examined during operational testing to determine the system's capability to perform its mission. A key question to be answered by operational testers when evaluating a system's overall operational effectiveness, suitability, and operational capabilities.

Critical Technical Parameter—Measurable critical system characteristics that, when achieved, allow the attainment of operational performance requirements. They are technical measures derived from user requirements. Failure to achieve a critical technical parameter should be considered a reliable indicator that the system is behind in the planned development schedule or will likely not achieve an operational requirement.

Criticality Analysis—An end-to-end functional decomposition performed by systems engineers to identify mission critical functions and components. Includes identification of system missions, decomposition into the functions to perform those missions, and traceability to the hardware, software, and firmware components that implement those functions. Criticality is assessed in terms

of the impact of function or component failure on the ability of the component to complete the system mission(s).

Critical Component—A component which is or contains Information and Communications Technology, including hardware, software, and firmware, whether custom, commercial, or otherwise developed, and which delivers or protects mission critical functionality of a system or which, because of the system's design, may introduce vulnerability to the mission critical functions of an applicable system.

Critical Program Information—Refers to the United States capability elements that contribute to the warfighters' technical advantage, which if compromised, undermine United States military preeminence.

Cyber Attack—Actions taken in cyberspace that create noticeable denial effects (i.e., degradation, disruption, or destruction) in cyberspace or manipulation that leads to denial that appears in a physical domain, and is considered a form of fires.

Cyber Testing—The testing of systems and sub-systems that operate in the cyberspace domain, and the access pathways to such systems that are part of DoD weapon systems. Cyber testing includes cybersecurity testing (with associated Risk Management Framework processes) and cyber resiliency testing.

Cybersecurity—Prevention of damage to, protection of, and restoration of computers, electronic communications systems, electronic communications services, wire communication, and electronic communication, including information contained therein, to ensure its availability, integrity, authentication, confidentiality, and nonrepudiation.

Cybersecurity Testing—The testing of the systems' and sub-systems' ability to protect or defend against a cyber attack. Cybersecurity testing focuses on identifying and eliminating or mitigating system cyber vulnerabilities. It is scoped through assessing a system's cyber boundary and risk to mission assurance. Risk analysis, at a minimum, should consider the threat and threat severity, the likelihood of attack, and system vulnerabilities. Cybersecurity is evaluated based on the Security Assessment Plan, Program Protection Plan, Information Support Plan, and Risk Management Frame-work artifacts.

Cyber Resiliency Testing—The testing of the systems' and sub-systems' ability to protect, mitigate and recover from a cyber attack if cybersecurity defensive protections are defeated. Cyber resiliency testing evaluates a system's ability to meet operational requirements while under cyber attack. Cyber resiliency testing focuses on detection and response to a successful cyber attack and the continuity, recovery and restoration of data and system functionality. Cyber resiliency testing also evaluates the operators' ability to continue mission execution if system restoration/recovery is impossible or impractical.

Cyberspace—The interdependent network of information technology infrastructures, and includes the Internet, telecommunications networks, computer systems, and embedded processors and controllers in critical industries. Cyberspace is a contested domain and provides the opportunity for asymmetric actions that generate effects across the physical domains.

Dedicated Operational Testing—Operational test and evaluation that is conducted independently from contractors, developers, and operational commands and used to support production or fielding decisions.

Deficiency Report—The generic term used within the USAF to record, submit, and transmit deficiency data which may include, but is not limited to, a Deficiency Report involving quality, materiel, software, warranty, or informational deficiency data submitted using Standard Form 368, *Product Quality Deficiency Report,* or equivalent format.

Deployment—The relocation of forces and materiel (to include software deployment) to desired operational areas.

Developmental Test and Evaluation—Test and evaluation conducted to evaluate design approaches, validate analytical models, quantify contract technical performance and manufacturing quality, measure progress in system engineering design and development, minimize design risks, predict integrated system operational performance (effectiveness and suitability) in the intended environment, and identify system problems (or deficiencies) to allow for early and timely resolution. Developmental Test and Evaluation includes contractor testing and is conducted over the life of the system to support acquisition and sustainment efforts.

Developmental Test and Evaluation Sufficiency Assessment—Assessment of the sufficiency of Developmental Test and Evaluation in the Milestone B and Milestone C brief summary reports provided to the congressional defense committees and, in the case of intelligence or intelligence-related activities, the congressional intelligence committees. The Milestone B sufficiency assessment will address the sufficiency of: the developmental test and evaluation plans, schedule, resources, mitigation of known risks, and test criteria for entering production phase. The Milestone C sufficiency assessment will address the sufficiency of: developmental test and evaluation completed, plans and resources available for remaining developmental test and evaluation, mitigation of risks identified, and readiness of the system to perform scheduled initial operational test and evaluation.

Early Operational Assessment—An operational assessment conducted before Milestone B. An Early Operational Assessment assesses the design approach sufficiently early in the acquisition process to assure it has the potential to fulfill user requirements.

Enabling Concept—Describes how a particular task or procedure is performed, within the context of a broader functional area, using a particular capability, such as a specific technology, training or education program, organization, facility, etc. An enabling concept describes the accomplishment of a particular task that makes possible the performance of a broader military function or sub-function.

Enhancement—A condition that improves or complements successful mission accomplishment but is not absolutely required. The recommendation, if incorporated, will enhance a system's operational safety, suitability and/or effectiveness. An enhancement report should not be designated as such solely due to an "out-of-scope" effort of the contractual requirements.

Evaluation Criteria—Standards by which the accomplishment of required technical and operational effectiveness and/or suitability characteristics, or resolution of operational issues, may be addressed.

Executing Test Organization—Test organization, usually at the squadron level, accomplishing Developmental Test under supervision of the Lead Developmental Test and Evaluation Organization.

Failure Mode, Effects, and Criticality Analysis—A procedure for analyzing each potential failure mode in a product to determine the results or effects thereof on the product. When the analysis is extended to classify each potential failure mode according to its severity and probability of occurrence, it is called a Failure Mode, Effects, and Criticality Analysis. This analysis is typically delivered by the contractor and sustained by Air Force reliability and maintainability systems engineering.

Fielding Decision—The decision to acquire and/or release a system to users in the field.

First Article Test—Production testing that is planned, conducted, and monitored by the materiel developer. First Article Test includes pre-production and initial production testing conducted to ensure that the contractor can furnish a product that meets the established technical criteria.

Follow-on Operational Test and Evaluation—Follow-on Operational Test and Evaluation is the continuation of Operational Test and Evaluation after Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, or Operational Utility Evaluation and is conducted only by AFOTEC. It answers specific questions about unresolved Critical Operational Issues and test issues; verifies the resolution of deficiencies or shortfalls determined to have substantial or severe impact(s) on mission operations; or completes test and evaluation of those areas not finished during Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, or Operational Utility Evaluation.

Force Development Evaluation—A type of Operational Test and Evaluation performed by MAJCOM Operational Test Organizations in support of MAJCOM-managed system acquisition-related decisions prior to initial fielding, or for MAJCOM sustainment or upgrade activities.

Foreign Comparative Test—A DoD Test and Evaluation program that is prescribed in 10 USC § 2350a(g), and is centrally managed by the Comparative Testing Office, Office of the Under Secretary of Defense (Research and Engineering) (USD(R&E)). It provides funding for U.S. Test and Evaluation of selected equipment items and technologies developed by allied countries when such items and technologies are identified as having good potential to satisfy valid DoD requirements.

Full-Up, System-Level Testing—Testing that fully satisfies the statutory requirement for "realistic survivability testing" or "realistic lethality testing" as defined in 10 USC § 2366.

Implementing Command—Air Force Materiel Command and Air Force Space Command. The command providing the majority of resources in direct support of the Program Manager responsible for development, production, and sustainment activities. Such resources include technical assistance, infrastructure, test capabilities, laboratory support, professional education, training and development, management tools, and all other aspects of support, including support for product development and Developmental Test and Evaluation.

Increment—A formal acquisition effort approved by the milestone decision authority. Each increment may have one or more releases constituting a change to the fielded hardware and software baseline or a militarily useful and supportable operational capability that can be effectively developed, produced or acquired, deployed, and sustained. Each increment of capability will have its own set of threshold and objective values set by the user.

Information Support Plan—The identification and documentation of information needs, infrastructure support, information technology and national security systems interface

requirements and dependencies focusing on net-centric, interoperability, supportability and sufficiency concerns.

Initial Operational Test and Evaluation—Initial operational test and evaluation is the final dedicated phase of operational test and evaluation preceding a full-rate production decision. It is the final evaluation that entails dedicated operational testing of production representative test articles and uses typical operational scenarios that are as realistic as possible. Initial operational test and evaluation is conducted by an operational test and evaluation agency independent of the contractor, program management office, or developing agency.

Integrated Product Support Elements—A composite of all support considerations necessary to ensure the effective and economical support of a system for its life cycle. It is an integral part of all other aspects of system acquisition and operation. **Note:** The twelve product support elements are: sustaining/systems engineering; design interface; supply support; maintenance planning and management; support equipment/automatic test systems; facilities; packaging, handling, storage, and transportation; technical data management/technical orders; manpower and personnel; training; computer resources; and protection of critical program information and anti-tamper provisions.

Integrated Testing—The collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, evaluation and reporting by all stakeholders, particularly the developmental (both contractor and government) and Operational Test and Evaluation communities.

Integrated Test Team—A cross-functional team of empowered representatives from multiple disciplines and organizations and co-chaired by operational testers and the Program Manager. The Integrated Test Team is responsible for developing the strategy for Test and Evaluation, Test and Evaluation Master Plan, assisting the acquisition community with Test and Evaluation matters, and guiding the development of test plans that are integrated. **Note:** The Integrated Test Team is the Air Force equivalent to the Test and Evaluation Working Integrated Product Team described in the *Defense Acquisition Guidebook*.

Joint Capability Technology Demonstration—Joint Capability Technology Demonstrations fill the gap between science and technology and acquisition for the combatant commands. Joint Capability Technology Demonstrations focus on resolving the joint, combined, coalition, and interagency warfighting and operational problems of the combatant commands within a 1- to 3-year timeline. Joint Capability Technology Demonstrations resolve problems primarily by conducting technology and operational demonstrations and operational utility assessments of mature technology/solutions (Technology Readiness Level 5-7) and transitioning them to the acquisition community for post-Joint Capability Technology Demonstration development, production, fielding, and operation and maintenance.

Joint Test and Evaluation—An OSD-sponsored Test and Evaluation program conducted among more than one military Service to provide Test and Evaluation information on combat operations issues and concepts. Joint Test and Evaluation does not support system acquisition.

Lead Command—The command designated to advocate for a weapon system and respond to issues addressing its status and use. Advocacy includes capabilities-based planning, programming, and budgeting for designated system-wide unique equipment, upgrades/modifications, initial spares and other weapon system-unique logistics issues, and follow-on test and evaluation.

Inherent in lead command responsibility is also the responsibility for support systems and equipment directly associated with a particular weapon system.

Lead Developmental Test and Evaluation Organization—The Lead Developmental Test and Evaluation Organization functions as the lead integrator for a program's Developmental Test and Evaluation activities. It is separate from the program office, but supports the Program Manager and Integrated Test Team in a provider-customer relationship with regard to scope, type and conduct of required Developmental Test and Evaluation. The Lead Developmental Test and Evaluation Organization assists the Chief Developmental Tester with oversight of contractor Developmental Test and Evaluation results and managing studies, analyses and program documentation from the requirements, acquisition and cyber test communities. The Lead Developmental Test and Evaluation Organization is selected from the list of qualified candidates published by AFMC and AFSPC.

Lethality—The capability of a munition or directed energy weapon to cause damage that will cause the loss or a degradation in the ability of a target system to complete its designated mission(s).

Life Cycle Sustainment Plan—The Life Cycle Sustainment Plan describes the plan for the integration of sustainment activities into the acquisition strategy and operational execution of the product support strategy.

Live Fire Test and Evaluation—The firing of actual weapons (or surrogates if actual weapons are not available) at components, subsystems, sub-assemblies, and/or full-up, system-level targets or systems to examine personnel casualties, system vulnerabilities, or system lethality; and the evaluation of the results of such testing.

Lot Acceptance Test—A test based on a sampling procedure to ensure that the product retains its quality. No acceptance or installation should be permitted until this test for the lot has been successfully completed.

Low—Rate Initial Production—Production of the system in the minimum quantity necessary to provide production-configured or representative articles for operational tests pursuant to 10 USC § 2399, to establish an initial production base for the system, and to permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of operational testing. **Note**: The Low-Rate Initial Production quantity should not exceed 10 percent of the total number of articles to be produced as determined at the Milestone B decision.

Maintainability—The capability of an item to be retained in or restored to a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and routines, at each prescribed level of maintenance and repair.

Major Munitions Program—See Covered System.

Measurable—Having qualitative or quantitative attributes (e.g., dimensions, velocity, capabilities) that can be ascertained and compared to known standards. (See Testable.)

Military Utility—The military worth of a system performing its mission in a competitive environment including versatility (or potential) of the system. It is measured against the operational concept, operational effectiveness, safety, security, and cost/worth. Military utility estimates form a rational basis for making management decisions

Military Utility Assessment—A determination of how well a capability or system in question responds to a stated military need, to include a determination of its potential effectiveness and suitability in performing the mission. It is a "characterization" of the capability or system as determined by measures of effectiveness, measures of suitability, measures of performance, and other operational considerations as indicators of military utility, as appropriate, and answers the questions, "What can it do?" and "Can it be operated and maintained by the user?"

Modification—For the purposes of this instruction, a modification is defined as an alteration to the form, fit, function, or interface (F3I) of an in-service AF hardware or software Configuration Item.

Multi-Service—Involving two or more military Services or DoD components.

Multi—Service Operational Test and Evaluation—Operational Test and Evaluation conducted by two or more Service Operational Test Agencies for systems acquired by more than one Service. Multi-Service Operational Test and Evaluation is conducted according to the Test and Evaluation directives of the lead Operational Test Organization, or as agreed in a memorandum of agreement between the participants. **Note**: MAJCOM Operational Test Organizations may at times be responsible for conducting. Multi-Service Operational Test and Evaluation in lieu of AFOTEC.

Objective—An operationally significant increment above the threshold. An objective value may be the same as the threshold when an operationally significant increment above the threshold is not significant or useful.

Operating Concept—A description in broad terms of the application of military art and science within a defined set of parameters. In simplest terms, operating concepts articulate how a commander will plan, prepare, deploy, employ or sustain a joint force against potential adversaries within a specified set of conditions. Operating concepts encompass the full scope of military actions required to achieve a specific set of objectives.

Operational Assessment—An analysis of progress toward operational capabilities made by an Operational Test Organization, with user support as required, on other than production systems. The focus of an operational assessment is on significant trends noted in development efforts, programmatic voids, areas of risk, adequacy of requirements, and the ability of the program to support adequate operational testing. Operational assessments may be made at any time using technology demonstrators, prototypes, mockups, engineering development models, or simulations, but will not substitute for the dedicated Operational Test and Evaluation necessary to support full production decisions.

Operational Command—Air Combat Command, Air Mobility Command, AF Special Operations Command, Air Education and Training Command, Air Force Global Strike Command, and Air Force Space Command. Those commands that will ultimately operate, or are operating, a system, subsystem, or item of equipment.

(Added-AFMC) Operational Demonstrations—User-command requests to a program office to demonstrate a proof-of-concept for a future capability. The purpose of these demonstrations are to determine feasibility and not to verify and validate a fully deliverable product.

Operational Effectiveness—Measure of the overall ability of a system to accomplish a mission when used by representative personnel in the environment planned or expected for operational

employment of the system, considering organization, doctrine, tactics, supportability, survivability, vulnerability, and threat.

Operational Environment—A composite of the operational conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander.

Operational Suitability—The degree to which a system can be placed and sustained satisfactorily in field use with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, habitability, manpower, logistics supportability, natural environmental effects and impacts, documentation, and training requirements.

Operational Test Agency—An independent agency reporting directly to the Service Chief that plans and conducts operational tests, reports results, and provides evaluations of overall operational capability of systems as determined by effectiveness, suitability, and other operational considerations. Each Service has one designated Operational Test Agency which are as follows. The Air Force has the Air Force Operational Test and Evaluation Center (AFOTEC). The Navy has the Operational Test and Evaluation Force (OPTEVFOR). The Army has the Army Test and Evaluation Command (ATEC). The Marine Corps has the Marine Corps Operational Test and Evaluation Agency (MCOTEA).

Operational Testing—A generic term encompassing the entire spectrum of operationally oriented test activities, including assessments, tests, and evaluations. Not a preferred term due to its lack of specificity.

Operational Test and Evaluation—Testing and evaluation conducted in as realistic an operational environment as possible to estimate the prospective system's operational effectiveness, suitability, and operational capabilities. In addition, Operational Test and Evaluation provides information on organization, personnel requirements, doctrine, and tactics. It may also provide data to support or verify material in operating instructions, publications, and handbooks. **Note:** The generic term Operational Test and Evaluation is often substituted for Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation, Force Development Evaluation, Weapons System Evaluation Program, and Tactics Development and Evaluation and depending on the context, can have the same meaning as those terms.

Operational Test Organization—A generic term for any organization that conducts operational testing as stated in its mission directive.

Operational Utility Assessment—Operational Utility Assessments assess the military utility of a system in support of Joint Concept Technology Demonstration and experimentation programs when exposed to representative threats while being operated and maintained in a realistic operational environment by typical operators and maintainers. Operational utility assessments require operational experience to apply judgment and place system performance in the context of intended operations

Operational Utility Evaluation—Evaluations of military capabilities conducted to demonstrate or validate new operational concepts or capabilities, upgrade components, or expand the mission or capabilities of existing or modified systems. AFOTEC or MAJCOMs may conduct OUEs whenever a dedicated Operational Test and Evaluation event is required, but the full scope and rigor of a formal Initial Operational Test and Evaluation, Qualification Operational Test and

Evaluation, Follow-on Operational Test and Evaluation, or Force Development Evaluation is not appropriate or required. Operational Utility Evaluations may be used to support operational decisions (e.g., fielding a system with less than full capability) or acquisition-related decisions (e.g., low-rate production) when appropriate throughout the system. Operational Utility Evaluations will not be used when Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, or Force Development Evaluation are more appropriate per existing guidance and definitions.

Operator—See "User." Refers to the operating command which is the primary command operating a system, subsystem, or item of equipment. Generally, applies to those operational commands or organizations designated by Headquarters, U.S. Air Force to conduct or participate in operations or operational testing, interchangeable with the term "using command" or "user." In other forums the term "warfighter" or "customer" is often used. "User" is the preferred term in this AFI.

Oversight—Senior executive-level monitoring and review of programs to ensure compliance with policy and attainment of broad program goals.

Oversight Program—A program on the OSD Test and Evaluation Oversight List for Developmental Test and Evaluation, Live Fire Test and Evaluation, and/or Operational Test and Evaluation. The list includes all Major Defense Acquisition Programs (e.g., Acquisition Category I), Major Automated Information Systems (e.g., Acquisition Category IA), and any other programs selected for OSD Test and Evaluation Oversight in accordance with AFI 63-101_20-101. These programs require additional documentation and have additional review, reporting, and approval requirements.

Participating Test Organization—Any test organization required to act in a supporting role to the Executing Test Organization, Operational Test Organization, or Lead Developmental Test and Evaluation Organization by providing specific Test and Evaluation data or resources for a Test and Evaluation program or activity.

Platform Information Technology—A special purpose information technology system which employs computing resources (i.e., hardware, firmware, and optionally software) that are physically embedded in, dedicated to, or essential in real time to mission performance [of a host system]. Platform Information Technology only performs (i.e., is dedicated to) the information processing assigned to it by its hosting special purpose system (this is not for core services).

Pre-Production Qualification Test—The formal contractual tests that ensure design integrity over the specified operational and environmental range. These tests usually use prototype or pre-production hardware fabricated to the proposed production design specifications and drawings. Such tests include contractual reliability and maintainability demonstration tests required prior to production release.

Product Support—A continuous and collaborative set of activities that establishes and maintains readiness and the operational capability of a system, subsystem, or end-item throughout its life cycle to meet its availability and wartime usage requirements. Planned product support includes the following: test, measurement, and diagnostic equipment; spare and repair parts; technical data; support facilities; transportation requirements; training; manpower; and software.

Production Acceptance Test and Evaluation—Test and evaluation of production items to demonstrate that items procured fulfill requirements and specifications of the procuring contract or agreements.

Production Qualification Test—A technical test conducted prior to the full rate production decision to ensure the effectiveness of the manufacturing processes, equipment, and procedures. These tests are conducted on a number of samples taken at random from the first production lot, and are repeated if the manufacturing process or design is changed significantly, or when a second source is brought on line.

Program Element Monitor—The individual from the Secretariat or Air Staff who has overall responsibility for the program element and who harmonizes program documentation.

Program Manager—The designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The Program Manager shall be accountable for credible cost, schedule, and performance reporting to the Milestone Decision Authority. Applies collectively to system program directors, product group managers, single managers, acquisition Program Managers, and weapon system managers. Operating as the single manager, the Program Manager has total life cycle system management authority. **Note**: This AFI uses the term "Program Manager" for any designated person in charge of acquisition activities, to include those prior to Milestone A (i.e., before a technology project is officially designated an acquisition program).

(Added-AFMC) Proper program test representation—An assigned APDP qualified Test Manager in the program office.

Prototype—A model suitable for evaluation of design, performance, and production potential. **Note**: The Air Force uses prototypes during development of a technology project or acquisition program for verification or demonstration of technical feasibility. Prototypes are not usually representative of the final production item.

Qualification Operational Test and Evaluation—A tailored type of Initial Operational Test and Evaluation performed on systems for which there is little to no Research Developmental Test and Evaluation-funded development effort. Commercially available off-the-shelf, non-developmental items, and government furnished equipment are tested in this manner.

Qualification Test and Evaluation—A tailored type of Developmental Test and Evaluation for which there is little to no Research Developmental Test and Evaluation-funded development effort. Commercially available off-the-shelf, non-developmental items, and government furnished equipment are tested in this manner.

Recoverability—Following combat damage, the ability to take emergency action to prevent loss of the system, to reduce personnel casualties, or to regain weapon system combat mission capabilities.

Release—a distinct, tested, deployable software element of a militarily useful capability to the government. A release is an increment (version) of the system/software that is transferred from one organization to another.

Relevant Environment—The specific subset of the operational environment that is required to demonstrate critical "at risk" aspects of the final product performance in an operational environment. It is an environment that focuses specifically on stressing the technology in question.

Not all systems, subsystems, and/or components need to be operated in the operational environment in order to satisfactorily address performance margin requirements. **Note:** A relevant environment is required for Technology Readiness Levels 5 and 6.

Reliability—The capability of a system and its parts to perform its mission without failure, degradation, or demand on the support system.

Research, Development, Test, and Evaluation—The type of funding appropriation (3600) intended for research, development, test, and evaluation efforts. **Note**: The term "research and development" broadly covers the work performed by a government agency or the private sector. "Research" is the systematic study directed toward gaining scientific knowledge or understanding of a subject area. "Development" is the systematic use of the knowledge and understanding gained from research for the production of useful materials, devices, systems, or methods. Research, Developmental, Test, and Evaluation includes all supporting test and evaluation activities.

Risk—A measure of the inability to achieve program objectives within defined cost and schedule constraints. Risk is associated with all aspects of the program, e.g., threat, technology, design processes, or Work Breakdown Structure elements. It has two components: the probability of failing to achieve a particular outcome, and the consequences of failing to achieve that outcome.

Severity Category—The category a certifying authority assigns to an information technology system security weakness or shortcoming as part of a certification analysis to indicate the risk level associated with the security weakness and the urgency with which the corrective action must be completed. Severity categories are expressed as "Category I, Category II, or Category III," with Category I indicating the greatest risk and urgency. Severity categories are assigned after consideration of all possible mitigation measures that have been taken within system design/architecture limitations for the DoD information system in question.

Simulator Certification—The process of ensuring through validation of hardware and software baselines that a training system and its components provide accurate and credible training. The process also makes sure the device continues to perform to the delivered specifications, performance criteria, and configuration levels. It will also set up an audit trail regarding specification and baseline data for compliance and subsequent contract solicitation or device modification.

Simulator Validation—The process for comparing a training device's operating parameters and performance to the current intelligence assessment of a weapon system, threat, and interaction between the weapon system and threat, and documenting the differences and impacts. This process includes generation and deployment of an intelligence data baseline of the system, comparison of simulator characteristics and performance, support for the modification and upgrade of the simulator, a comparison of simulator and threat operating procedures, and correction of any significant deficiencies. Uncorrected deficiencies are identified and published in validation reports. The process continues throughout the life cycle of the simulator.

Specification—A document intended primarily for use in procurement which clearly and accurately describes the essential technical requirements for items, materials, or services, including the procedures by which it will be determined that the requirements have been met. Specifications may be prepared to cover a group of products, services, or materials, or a single product, service, or material, and are general or detail specifications.

Strategy for Test and Evaluation—A high-level conceptual outline of all Test and Evaluation required to support development and sustainment of an acquisition program.

Sufficiency of Operational Test Review—An examination by MAJCOM operational testers of all available test data to: (1) determine if adequate testing has been accomplished for programs of limited scope and complexity; and (2) to assess the risk of fielding or production without a dedicated Operational Test and Evaluation. An examination of existing test data, not an operational test per se.

Survivability—The capability of a system and crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission. Survivability consists of susceptibility, vulnerability, and recoverability.

Susceptibility—The degree to which a weapon system is open to effective attack due to one or more inherent weaknesses. (Susceptibility is a function of operational tactics, countermeasures, probability of enemy fielding a threat, etc.) Susceptibility is considered a subset of survivability.

Sustainment—Activities that sustain systems during the operations and support phases of the system life cycle. Such activities include any investigative test and evaluation that extends the useful military life of systems, expands the current performance envelope or capabilities of fielded systems or modifies/acquires support equipment for the system. Sustainment activities also include Test and Evaluation for modifications and upgrade programs, and may disclose system or product deficiencies and enhancements that make further acquisitions necessary.

System Security Engineer—Responsible for implementing SSE processes and best practices to ensure cybersecurity is addressed throughout the acquisition life cycle.

Tactics Development and Evaluation—Tactics Development and Evaluation is a tailored type of Force Development Evaluation specifically designed to further exploit doctrine, system capabilities, tactics, techniques, and procedures during the sustainment portion of the system life cycle. Tactics Development and Evaluations normally identify non-materiel solutions to tactical problems or evaluate better ways to use new or existing systems.

(Added-AFMC) Test Execution Authority—The government individual responsible for accepting the Safety Review Board and Technical Review Board results and approving the test to proceed with any residual risk. The Test Execution Authority will reside within the same Center as the LDTO and is typically within the LDTO chain of command. For test programs implementing a PMO Alt-LDTO, the Center Test Authority will be the Test Execution Authority.

Testable—The attribute of being measurable and repeatable with available test instrumentation and resources. **Note**: Testability is a broader concept indicating whether Test and Evaluation infrastructure capabilities are available and capable of measuring the parameter. The difference between testable and measurable may indicate a test limitation. Some requirements may be measurable but not testable due to Test and Evaluation infrastructure shortfalls, insufficient funding, safety, or statutory or regulatory prohibitions.

Test and Evaluation—The act of generating empirical data during the research, development or sustainment of systems, and the creation of information through analysis that is useful to technical personnel and decision makers for reducing design and acquisition risks. The process by which systems are measured against requirements and specifications, and the results analyzed so as to gauge progress and provide feedback.

Test and Evaluation Master Plan—Documents the overall structure and objectives of the Test and Evaluation program. It provides a framework within which to generate detailed Test and Evaluation plans and it documents schedule and resource implications associated with the Test and Evaluation program. The Test and Evaluation Master Plan identifies the necessary developmental, operational, and live-fire test activities. It relates program schedule, test management strategy and structure, and required resources to: Critical Operational Issues; Critical Technical Parameters; objectives and thresholds documented in the requirements document; and milestone decision points.

Test and Evaluation Organization—Any organization whose designated mission includes test and evaluation.

Test Deferral—The movement or delay of testing and/or evaluation of a specific critical technical parameter, operational requirement, or critical operational issue to a follow-on increment or later test period. A test deferral does not change the requirement to test a system capability or function.

Test Director——A person responsible for coordinating, leading, and executing a test and reporting the results according to a specific test plan.

Test Integrated Product Team—Any temporary group consisting of testers and other experts who are focused on a specific test issue or problem. There may be multiple Test Integrated Product Teams for each acquisition program/project.

Test Limitation—Any condition that hampers but does not preclude adequate test and/or evaluation of a critical technical parameter, operational requirement, or critical operational issue during a Test and Evaluation program.

Test Manager——A designated government Test and Evaluation professional in a non-Major Defense Acquisition Program/non-Major Automated Information System program office selected to coordinate, plan, and manage all Developmental Test and Evaluation activities, to include contractor testing, and who makes technically informed, objective judgments about Developmental Test and Evaluation results. For Major Defense Acquisition Programs or Major Automated Information System programs, this responsibility is fulfilled by the Chief Developmental Tester.

Test Resources—A collective term that encompasses all elements necessary to plan, conduct, and collect/analyze data from a test event or program. Elements include test funding and support manpower (including temporary duty costs), test assets (or units under test, test asset support equipment, technical data, simulation models, test data analysis software, test beds, threat simulators, surrogates and replicas, special instrumentation peculiar to a given test asset or test event, targets, tracking and data acquisition, instrumentation, equipment for data reduction, communications, meteorology, utilities, photography, calibration, security, recovery, maintenance and repair, frequency management and control, and base/facility support services.

Test Resource Plan—The single program document AFOTEC uses to request personnel and other resource support for Operational Test and Evaluation from MAJCOMs and other agencies.

Test Team—A group of testers and other experts who carry out integrated testing according to a specific test plan. **Note**: A combined test force is one way to organize a test team for integrated testing.

Threshold—A minimum acceptable operational value below which the utility of the system becomes questionable.

Trusted Systems and Networks—A comprehensive systematic approach that analyzes threats, vulnerabilities, and mitigation strategies to preserve mission assurance.

User—Refers to the operating command which is the primary command operating a system, subsystem, or item of equipment. Generally, applies to those operational commands or organizations designated by Headquarters, U.S. Air Force to conduct or participate in operations or operational testing, interchangeable with the term "using command" or “operator.” In other forums the term “warfighter” or “customer” is often used. Also refers to maintainers. “User” is the preferred term in this AFI.

Validation—The process of evaluating a system or software component during, or at the end of, the development process to determine whether it satisfies specified requirements.

Verification—Confirms that a system element meets design-to or build-to specifications. Throughout the system’s life cycle, design solutions at all levels of the physical architecture are verified through a cost-effective combination of analysis, examination, demonstration, and testing, all of which can be aided by modeling and simulation.

Verification, Validation and Accreditation—A continuous process in the life cycle of a model or simulation as it gets upgraded or is used for different applications

Vulnerability—The characteristic of a system that causes it to suffer a definite degradation (loss or reduction of capability to perform its designated mission) as a result of having been subjected to a certain (defined) level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability.

Attachment 2

INFORMATION REQUIREMENTS FOR OSD TEST AND EVALUATION OVERSIGHT PROGRAMS

A2.1. Information Requirements. Table A2.1 provides details about the information exchanges and interfaces between the Air Force and OSD. These timelines can be modified for a test and evaluation program supporting rapid acquisition approaches, to include Middle Tier Acquisition, tailored 5000-series acquisitions, agile software development approaches, etc. The requirements in this table may be modified by direction of, or by specific agreement with, the program action officer(s) in AF/TEP, DD(DTE&P), and DOT&E.

Table A2.1. Information Requirements for OSD Test and Evaluation Oversight Programs.

Item of Information	HAF OPRs	Due to OSD[2]	Comments
Test and Evaluation Master Plans[1] **a.** Draft Test and Evaluation Master Plan[3] **b.** Service-approved Test and Evaluation Master Plan **c.** Newly-designated Test and Evaluation Master Plan	OPR: Program Element Monitor[6] Office of Collateral Responsilibity (OCR): AF/TEP	**a.** 90 calendar days prior to milestone **b.** 45 calendar days prior to milestone, and again at 10 calendar days prior if OSD sends back for changes **c.** 120 calendar days after program designation for OSD Test and Evaluation Oversight	OSD (i.e., DD(DTE&P)) and DOT&E) approval required prior to milestones and major decision reviews. "Updates" required for significant changes. "Administrative changes" required for minor updates.
Live Fire Test and Evaluation Waivers and Alternate Live Fire Test and Evaluation Strategies and Plans (if required)	OPR: Program Element Monitor OCR: AF/TEP	Prior to Milestone B	DOT&E sends notification to Congress prior to Milestone B.
Test Concept Briefings for Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation, Force Development Evaluation to include all types of Operational Assessments. See Note 7 for Force Development Evaluations.	AF/TEP	Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation Test Concept Briefings (to include all Operational Assessments) 180 calendar days prior to test start unless waived by DOT&E.[8]	Requirement stated in DoDI 5000.02, Enclosure 2 and Enclosure 6,
Test Plans for Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on	AF/TEP	Required 60 calendar days prior to start of Initial Operational Test and Evaluation, Qualification Operational Test and	DOT&E written approval required before Initial Operational Test and Evaluation, Qualification Operational Test and

Operational Test and Evaluation, Operational Utility Evaluation, to include all types of Operational Assessments (Service-approved)		Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation, to include all Operational Assessments. **Note:** DOT&E may request an additional briefing on test plans prior to starting these tests.	Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation, or Operational Assessment may start. Report major revisions to DOT&E. **Note:** A briefing may be required on these plans at DOT&E's discretion.
Force Development Evaluation Plans[7]	AF/TEP	60 calendar days prior to start of designated Force Development Evaluations.[4, 7] **Note:** DOT&E may request an additional briefing on test plans prior to starting these tests.	DOT&E will direct which subparts of Operational Test and Evaluation Oversight programs require approval.
Significant Test Event Reports	a. Program Element Monitor for Developmental Test and Evaluation b. AF/TEP for Operational Test and Evaluation OPR: Operational Test Organization	24 hours after event	Events and addressees as listed in Test and Evaluation Master Plan and test plans.
Final Reports and Briefings: **a.** For Operational Assessment, Initial Operational Test and Evaluation, Qualification Operational Test and Evaluation, Follow-on Operational Test and Evaluation, Operational Utility Evaluation **b.** For Force Development Evaluation[7]	AF/TEP OPR: Integrated Test Team	**a.** and **b.** Reports due not later than 45 calendar days prior to the decision review according to **Paragraph 7.4.2**. For multi-service tests, reports are due 45 calendar days prior to the decision review.	A single report is required for multi-service programs. Final results briefings will be provided to DOT&E as requested.
Live Fire Test and Evaluation Reports	OPR: Program Element Monitor OCR: AF/TEP	45 calendar days prior to the FRP/FD decision review.	Due to DOT&E.
Synopsis Reports of Electronic Warfare Programs	AF/TEP	Due annually by 15 Nov to DD(DTE&P)	Congressionally required.[5]
Notes:			

1. All references to Test and Evaluation Master Plan in this table are meant to include the tailored implementing documentation described in **Paragraph 5.17.**, whichever is applicable. Only the Test and Evaluation portions of tailored implementing documents require AFOTEC/CC, Lead Developmental Test and Evaluation Organization, and AF/TE coordination, and DD(DTE&P) and DOT&E approval.
2. Time periods and dates are "Not Later Than" due dates to OSD.
3. "Draft Test and Evaluation Master Plan" means that all signatures below HQ USAF level or below the final signature for non-OSD oversight programs are complete according to **Paragraph 4.11.3.** through **Paragraph 4.11.7**.
4. Only for programs on OSD Operational Test and Evaluation Oversight.
5. Required by Public Law *103-160 § 220(a).*
6. The Program Element Monitor is the person from the Secretariat or Air Staff who has overall responsibility for a program element and who harmonizes program documentation.
7. Selected Force Development Evaluations require DOT&E Oversight (see **Paragraph 4.7.**) and will follow the same planning, briefing, and reporting guidance in **Paragraph 6.6.**
8. DOT&E memo, *Timeliness for Operational Test and Evaluation Plans*, 24 June 2011.

Attachment 3 (Added-AFMC)

AFMC LDTO CANDIDATE CRITERIA.

A3.1. (Added-AFMC) AFMC LDTO Candidate Criteria. Candidate test organizations will submit substantiated answers to the following questions for AFMC LDTO coordination and/or inclusion on the AFMC Form 42:

A3.1.1. **(Added-AFMC)** Does the proposed test organization possess a documented process for the test planning function to include a technical review, safety review, risk assessment, and test hazard analysis of the program prior to test execution?

A3.1.2. **(Added-AFMC)** Does the proposed test organization possess a documented process for accomplishing test execution?

A3.1.3. **(Added-AFMC)** Does the proposed test organization possess a documented process for providing timely test results and deficiency reporting?

A3.1.4. **(Added-AFMC)** Does the proposed test organization have documented evidence of possessing (or having access to) the appropriate manpower and resources necessary to accomplish test planning, test execution, and test reporting functions?

A3.1.5. **(Added-AFMC)** Does the proposed test organization possess a qualified workforce with the requisite mission experience, T&E Acquisition Professional Development Program or DoD 8570.01-M, *Information Assurance Workforce Improvement Program*, credentials, and management expertise required to accomplish the proposed tests?

A3.1.6. **(Added-AFMC)** Does the proposed test organization have the capability and capacity to accomplish the responsibilities described in, **paragraph 2.18**. Has the proposed LDTO agreed to accept the test effort?

A3.1.7. **(Added-AFMC)** Is the proposed test organization an inspectable unit, subject to compliance inspections by AFMC/IG or other Air Force or DoD inspection processes? If such LDTO is outside the Air Force, is there a similar self-inspection ability to monitor continued fitness for use with the Air Force test activity?

A3.1.8. **(Added-AFMC)** Is the proposed test organization an independent and unbiased organization removed from any conflict-of-interest with the program office requesting the test support? Does the LDTO report to a management chain outside the Program Executive Officer for the SUT? If not, describe the degree of independence that exists.

A3.1.9. **(Added-AFMC)** For Participating test organization and contractor testing, does the proposed test organization have the ability to adequately manage and oversee their test planning, execution, and reporting?

A3.1.10. **(Added-AFMC)** If requesting PMO Alt LDTO, list the organizations from the LDTO Candidate List included in the AFMC Form 42, which were considered, but not selected, and justification for each decision.